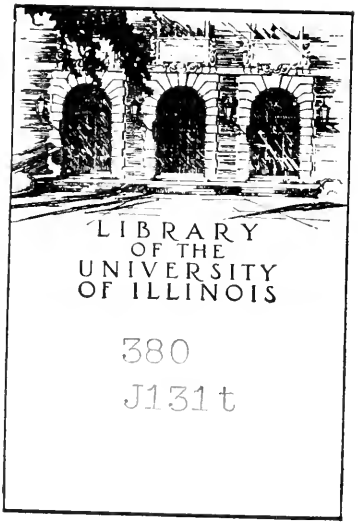
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TRANSPORTATION

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—BY—

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Author of "Corporations: Organization, Finance and Management"; formerly Managing Editor of the Chicago Journal.

and

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Author of "Business Principles and Methods," etc., etc.

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"When one considers the immense importance of railway transportation to the life of every community—indeed, of every individual—it is not to be wondered at that every one feels privileged to take a hand in the management of the railways. Our whole scheme of civilization today is dependent upon good and cheap transportation. The food upon our table is supplied from immense distances, and the same is true of all our daily needs."—*Frederic A. Delano, President Wabash Railroad.*

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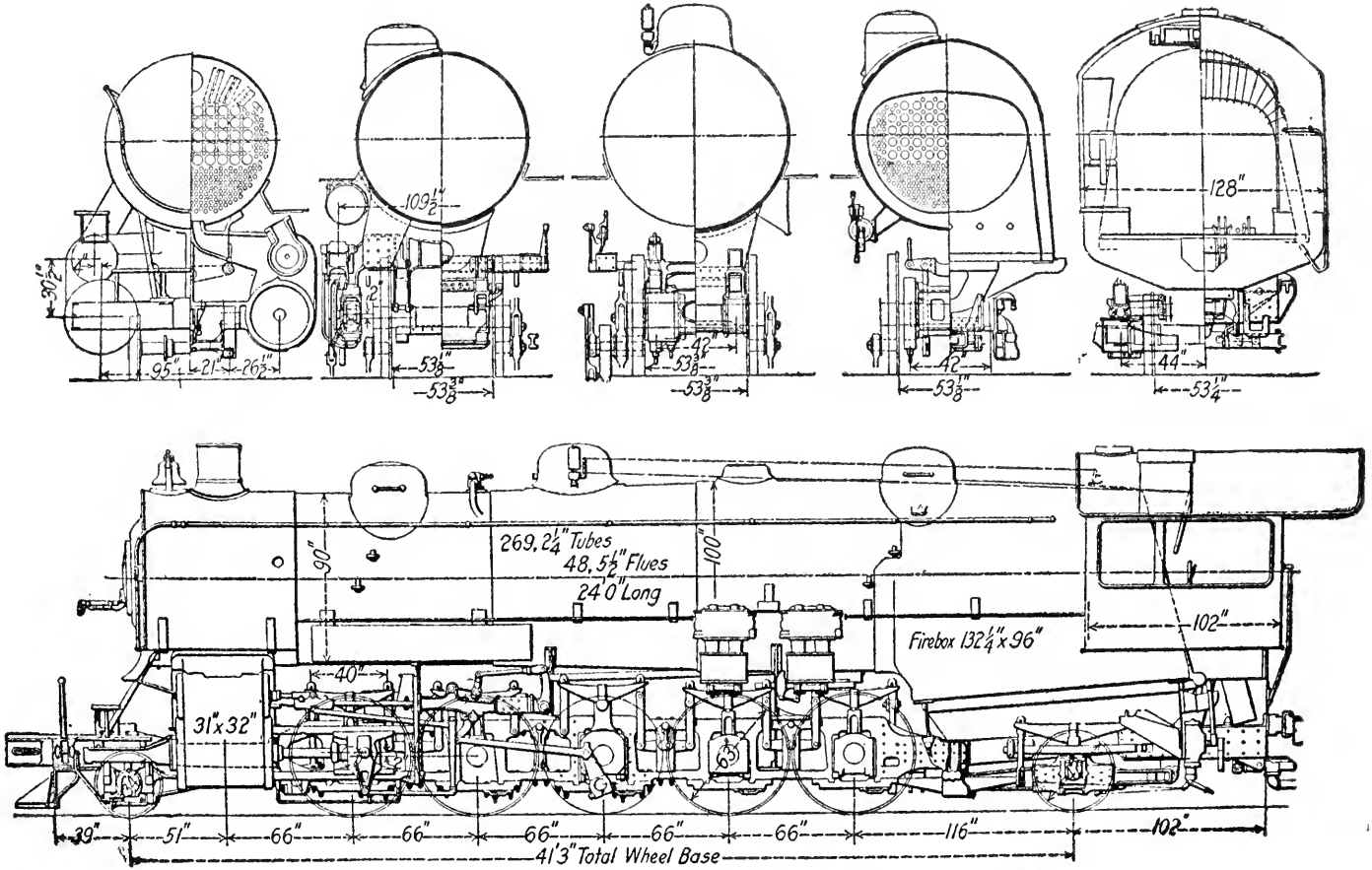

Longitudinal and Sectional Elevations, Erie 2-10-2 Type Locomotive
(Baldwin Locomotive Works)

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INTRODUCTION.

There is no one field of modern endeavor which affects so many people, directly and indirectly, as transportation. There is no other single branch of human effort—no one combination of capital and labor—which has such a vitally important bearing on the welfare of the civilized world.

In 1915 the railways of the United States employed in various capacities the enormous army of 1,848,883 men, to whom was paid $2,915,000,000 in salaries and wages. Similar statistics for the water lines of transportation, if obtainable, would increase these figures very materially. Some idea of the immensity of this force of employees engaged in rail transportation work alone may be had by comparison with the numerical strength of the Northern army engaged in the Civil War of 1861-1865. The total number was 2,656,053. But these were not all in service at once. The figures represent the total number of men enlisted or drafted during the entire four years of warfare. It is safe to say that the nearly 2,000,000 human beings engaged in railway operation in 1915 constituted a much larger army than was ever marshaled at one time in the history of the world.

Transportation facilities, or the lack of them, especially those afforded by railways, make and unmake communities. Wherever the railway penetrates prosperous villages spring up, and the terminal and divi-

sion headquarters assume importance in the business world. The money distributed in the form of salaries and wages is the very life blood of trade. It would be difficult to trace this distribution through its various channels, but the rent, food, fuel and clothing expenses of a million and a half of men and their dependents constitute an important factor in the commercial prosperity of the country.

Assuming the low ratio of three dependents to one worker as the proper average, we have the enormous number of 5,500,000 people obtaining a livelihood directly from transportation lines. This would make a city larger than Greater New York. If it were possible to effect an even distribution of the $2,915,000,000 of wage money, it would give every one of the 5,500,000 people an average annual income of approximately $500, while three-quarters of them would contribute in no way toward the earning of the money, aside from the possible performance of household services.

Astounding as these figures are, it is in the development of communities that transportation becomes of transcendent importance. There is no way of tabulating the results obtained in a manner which will show the actual money value accruing to each community thus benefited. The best that can be done is to show the general advancement in population and wealth.

In the ten years between 1900 and 1910 the population of the United States increased from 76,303,387 in 1900 to 93,402,151. The ratio of increase for the few years ending in 1915 has been equally great, and allowing it to be the same, we have now a population of approximately 100,000,000. With this increase in

population has naturally come an increase in wealth. The total true value of property in 1915 was $187,739,000,000.

Population follows the lines of least resistance. It naturally seeks an outlet where means of transportation are the best and most available. Where there are no adequate means of transportation the population will be sparse—in civilized countries at least. In the wake of population comes wealth. This may not be true as to such countries as China and India, but it does apply with full force to enlightened countries like the United States and Canada, where the great bulk of the people are producers, or wealth makers.

What influence has made a city of 2,500,000 people (Chicago) out of what was eighty years before a mere frontier trading post? Chicago did not really begin to grow until it got adequate transportation facilities. There was some growth, of course, but it was slow and desultory. It was not until the "iron horse" began to snort its way into town that Chicago really commenced to expand and assume a metropolitan importance. The railway brought people, and the people, in turn, established industries. The railway again made an outlet for the products of these industries. Finally the size of the traffic attracted other railroads and the process was repeated, growing in size and importance with each new avenue of transportation. It is in this way that every large community in the United States has been built up.

No accurate study of economics in this, or any other civilized country, can be made without a clear understanding of the part necessarily occupied by transportation facilities. While population might possibly increase

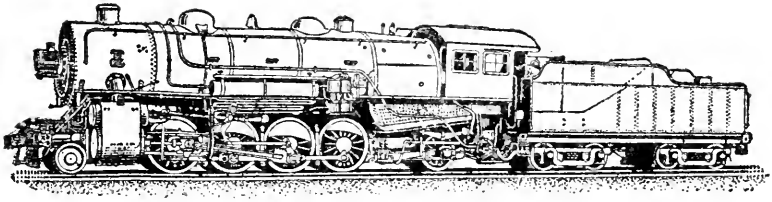
without modern means of transportation—but even this is doubtful—there would be no outlet for surplus products, and consequently no inducement for their production. Each community would exist upon and within itself and there would be no interchange of the results of labor, no bartering of goods for money.

The operation of transportation lines offers to young men of industry and ability a field of certain and profitable occupation. The man who will start in a modest position, master the details of each task as it comes to him, and show by his actions that he is master of his work, is sure to attract the attention of his superiors and be called up higher. Contrary to general belief, there is no business or profession in which there is less favoritism shown than railroading. In more than one instance railroad presidents began their apprenticeships as track workmen, and, while every competent track workman can not reasonably expect to become a railway president, such attainment is not impossible, and the number who have become division and general superintendents is surprisingly large.

Clerks in railway offices, the hard-working men who juggle with tariff sheets and keep the books, attract little attention, and their advancement is slow and limited. It is the men who make possible the moving of freight and passengers who draw upon themselves the compliments of their superior officers and, on doing a good piece of work, are invited to take a better job. The clerical force is essential to the welfare of a railroad, but its members are not so much in the limelight. One successful railway operator summed up the situation as follows:

"We are overwhelmed with applications from men who want to keep books or make out freight bills. Wages are low and advancement very slow up to a certain point, where it stops entirely. Brainy men, willing to do rough, hard work, are scarce, and a competent man doesn't work long in a position of this kind before he is found out and promoted."

While not absolutely essential, a knowledge of telegraphy is of great value to an operating official, and a pronounced aid to advancement. A bright, hard-working station agent who understands telegraphy, or a brainy track walker or section foreman who knows how to pull his road out of an emergency, will come to the front fast; the clerk in the general office will work out his life as an underling.



"Maximum" Locomotive—American Locomotive Co., N. Y.

CHAPTER I.

THE HISTORY OF TRANSPORTATION.

Transportation, in some form, has ever been one of the necessities of the human race. Primitive man met his needs in this line by the use of his fellow men as pack carriers, and in some parts of the world, notably the jungle regions of Africa, this method is still in vogue. From the human pack carrier there has been a gradual evolution, through animal pack-carriers and beasts of burden, stage coaches, boats and other conveyances, which has had its development in the modern railroad with its palace cars and luxurious sleepers, and the monster steamers of the lakes and oceans.

Nor should the automobile be overlooked when modern methods of transportation are under consideration. It is in practical use as a means of carrying both passengers and freight and, in its field is fully as important a factor in the world of transportation as the railway or the steamship.

Civilization Follows Transportation.

Civilization follows modern methods of transportation. Where primitive methods of freight and passenger traffic are still in vogue we find the progress of civilization slow, and frequently at a standstill. Wherever there is adequate modern transportation there we will find the greatest intellectual and commercial pros-

perity, thriving and advancing communities, and happy peoples.

It would be unfair to attribute all of this development to the railways, as water craft have had their full share in it and in many sections of the country are indispensable, but it has become a custom to consider the railways as first in the order of importance.

Developments of Sixty Years.

In 1915 there were 251,984 miles of railway in the United States, and 30,000 in Canada, a total of 281,984 miles. It seems incredible that this is the result of only seventy years of effort; in reality of less than sixty years. In 1820 railways were unknown, as were boats propelled by other than sail power or oars.

It was in 1820 that the idea of what has since become the modern railway was first suggested—an iron roadbed of ties and rails on which might be hauled, by some means, passengers and freight. The suggestion was laughed to scorn, the idea was denounced by the most learned and influential men of the day as preposterous. And yet there are people living today who were born in that year.

First Suggestor of Railroad.

Thomas Gray, a native of Leeds, England, and real originator of our railway system, was the first man to suggest the construction of a railroad. Gray, who was born about 1780, began to write and talk on this topic in 1820. The popular verdict was that he was insane. He called his project "A general iron railway." He petitioned Parliament, sought interviews with the lords

and other great men, and became the laughing-stock of all England. All transportation was then done by stage coaches and carters' vans. The locomotive engine was unknown. Gray persevered, and finally Stephenson took up the idea and produced an engine which made Gray's project feasible. But Gray did not benefit by it. What ultimately became of him is unknown, but up to 1846 he had been neglected, and was forced by poverty to sell glass on commission for a living.

Fulton Treated With Rudeness.

It is a peculiar coincidence that Robert Fulton, the pioneer of steamer transportation, was treated with the same contumely when he was trying to explain to the people of the United States that navigation by steam, propulsion of vessels in a given direction regardless of winds or tides, was possible. The people would have none of Fulton's theories. Neither would the lawmakers. When he solicited permission to use the hall of the House of Representatives for the purpose of delivering a lecture explanatory of his theory of steam navigation, he was rudely repulsed on the ground that it would be a discussion of a wildly visionary scheme.

Fulton began his experiments and studies in 1793, but it was not until 1807 that he built and navigated successfully the steamer Clermont, on the Hudson River. It was an illustration of dogged persistency in overcoming obstacles that would have discouraged a less resolute man.

What Fulton and Gray Did.

These ideas of Fulton as regards steamers, and of Gray as regards railways, were not in any way connected with the development of the steam engine itself. These men sought merely an application of steam engine power to the purposes of transportation. Up to the time the possibilities of this application were thus demonstrated, the steam engine had been merely a stationary force.

As a matter of fact, steam engines of a very primitive design, of course, were known as early as 130 B. C. Hero, of Alexandria, describes one of these machines in his *Pneumatics*. It was called the æolipile, and was a sort of steam reaction turbine. From then until the seventeenth century there was little improvement, and it was not until James Watt, in 1763, made certain additions and improvements, that the commercial worth of the steam engine was fully established.

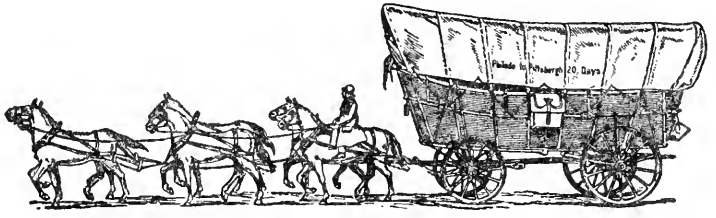
First Railway in America.

Some historians, referring to what is called the Granite Quarry Railway at Quincy, Mass., give 1827 as the date of the construction of the first railway in the United States. This is an error, as this road was not what may properly be called a railway. It was a tramway, over which cars were hauled part of the way by horses, and then up a steep incline by a cable drawn by a stationary engine. The main purpose in the construction of this tramway was to furnish a means of transporting stone from Quincy to Boston for the building of the Bunker Hill monument.

The first real railway in the United States, for general transportation purposes, was the Baltimore & Ohio, construction of which was begun in 1828, and this was at first intended to be operated by horses.

England First in the Field.

England antedates America in the beginning of actual railway construction by two years, the building of the Liverpool-Manchester line being started in 1826. Up to this time no satisfactory locomotive engine had



Transportation of Freight in 1825.

been devised, but the results of experiments had been such as to warrant the belief that a satisfactory engine would be ready by the time the roads were completed. This proved to be correct.

Railway construction was slow in those days. It was three years—in 1829—before the Liverpool-Manchester line was completed, and of the Baltimore & Ohio, begun in 1828, only thirteen miles were ready for operation in 1830. Five years later the entire length of the completed road was only 135 miles.

Results of Stephenson's Ingenuity.

In the meantime—1829—George Stephenson had become the "father of the locomotive." Utilizing the

principle of Watt, he succeeded in producing a locomotive that would run on rails and draw a train of loaded cars. A trial was made on the Liverpool-Manchester line in October, 1829, when the first Stephenson locomotive, the *Rocket,* attained a speed of twenty miles an hour. The day of doubt was past—the railway of today was assured.

Many amusing stories are told illustrative of Stephenson's grim wit and the obstacles he was forced to contend with. Even after he had demonstrated the practicability of his engine, some of the influential men of that day attempted to discourage him. One of them, a lord, said:

"This will never do, Stephenson. Your engine goes too fast. Suppose a cow should get on the track?"

"That woo' be awkward fo' th' coo, mae laird," replied Stephenson.

Start of New York Central Lines.

Following the demonstration of the practicability of the Stephenson engine, railway projects came thick and fast, especially in this country. The Charleston and Hamburg road, a South Carolina line, had 137 miles constructed in 1834, and was for some time the longest and most important line under one management in America. The Mohawk & Hudson, parent of the New York Central System, was begun in 1830. Numerous small companies, now amalgamated into the mammoth Central, took up the work of building roads between other cities, and by 1842 there was a system of rail communication between New York and Buffalo by way of Albany.

Features of Primitive Railroading.

These lines were not operated as one harmonious whole as they are at present. Each company was separate and distinct from the rest. It ran its cars over its own road only, and the passenger who wished to make the journey from New York to Buffalo was compelled to change cars at the end of each line. Sleepers and diners were, of course, unknown.

Freight—there was comparatively little of it in those days—was handled in the same manner as passengers, a transfer from one car to another being made at the end of each line. Such a thing as sending a car through to the destination of the freight, without "breaking bulk," had not occurred to the men who operated the various roads.

Rapid Development of Railways.

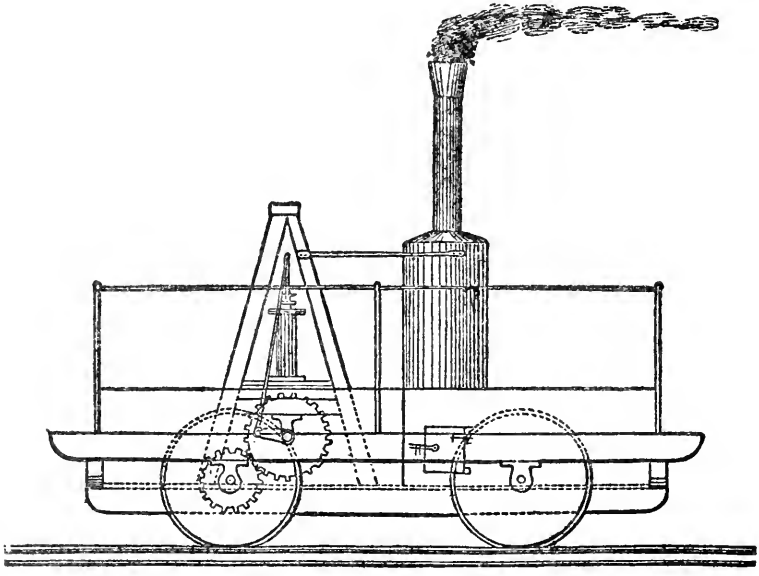
Railway development in other States was also rapid. Between 1830 and 1835 Pennsylvania constructed and operated 200 miles of road. The Columbia Railroad, the first division of the present Pennsylvania system, was constructed by the State, and by 1834 there was railway communication between Philadelphia and Pittsburg. In 1837 the Camden & Amboy line, connecting Philadelphia with New York, was finished, and the same year also saw the completion of the Philadelphia, Wilmington & Baltimore road. The Reading was opened in 1838.

Massachusetts was the next active State. By 1835 three lines connected Boston with Providence, Lowell and Worcester, and in 1841, what is now known as

the Boston & Albany, made connection with the lines for New York and Buffalo at Albany.

Use Home-Made Locomotives.

At first the few locomotives in use were imported from England but this policy was soon abandoned.



Locomotive Built by Peter Cooper in 1830.

The foreign-made engines were not adapted to American track conditions, and were also too expensive and difficult to obtain. Little attention was paid in those days to grades and curves by American railway builders. The only desire was "to get there." As a consequence the roads ran up hill and down and swung around sharp curves in reckless manner. The "rails" were often but little more than iron straps.

Under these conditions, aside from the important economies effected in time and money, the building of railway engines adapted to home needs became a necessity in America. Out of this has grown one of our greatest industries. In one year the N. Y. Central system alone paid out $31,000,000 for new engines and car equipment. And this in seventy years from the time when people were doubtful whether the expenditure of $5,000 in the construction and equipment of an entire road would be a paying investment.

Early American Locomotives.

Some of the early American locomotives were queer specimens of design and workmanship. Peter Cooper, who made a fortune in glue, and later gave the most of it away in educational enterprises, constructed the "Tom Thumb" in 1830. This was the first real, practical home-made locomotive. It was constructed for use on the Baltimore & Ohio, in the financing of which road Cooper was interested.

The "Tom Thumb" did all—and more—that could be expected of it. Weighing less than a ton, it hauled a load of four and one-half tons up steep grades, over poor tracks, at a speed of from 12 to 15 miles an hour.

Larger engines of greater power and more substantial finish were turned out by the West Point Foundry Works, and by Matthias Baldwin, of Philadelphia, the founder of the great plant now known as the Baldwin Locomotive Works. Baldwin's first locomotive, built in 1832, was called "Old Ironsides," and was used on the Columbia road.

Improvements came fast, and by 1836 Henry R. Campbell and James Brooks, of Philadelphia, the latter the founder of the Brooks Locomotive Works, had constructed the first locomotive with four connected driving wheels (two on each side) and a four-wheel forward truck.

Primary Purpose of Railways.

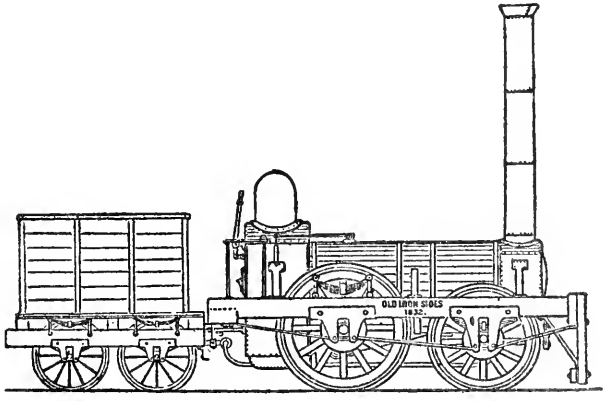
It is an interesting fact that our early railway building was almost entirely in the interest of passenger and mail transportation. Mails must be moved with reasonable rapidity; when business, or other reasons, made the moving of individuals from one place to another necessary, this necessity was generally imperative. People did not travel for pleasure in those days.

Freight transportation, owing to the expense, was an unknown, almost a negligible quantity. Communities lived almost entirely within themselves, producing about everything they consumed except a few imported articles, and these were looked upon as luxuries. People in the seaport towns like New York, Boston, Philadelphia, etc., used tea; those in the interior, unable or unwilling to pay the high cost of stage coach or carter's van transportation, got along without it.

There was very little moving of freight from one place to another. If a resident of city or village needed a wagon, the local wheelwright made it; the butter, eggs, poultry and wheat were teamed in by the neighboring farmers. Cordwood for fuel was abundant and close at hand. Such a thing as sending the surplus products of farm or factory to distant markets was

unknown and impossible; the carriage charge made such traffic prohibitive.

This was not the fault of the carter; his charges were not extortionate. They were high, higher than the traffic could bear, but this was because his expenses were relatively high. He traveled slowly, his horses



"Old Ironsides," Used in 1832.

and himself had to be fed, and his wagon capacity was limited. The result was that only a few expensive articles could be carried. The cost of transporting ordinary products was more than the selling price of these products when landed at their destination.

What Railways Have Done.

It was the destiny of the railways to change this condition. By making intercourse between communities reasonably certain and cheap they gradually brought about an interchange of commodities. The North wanted something the South had, and vice versa. It became the work of the railways to make the

exchange. The man who was making churns or wagons for his home community of 300 people found that the railways afforded him the means of reaching a larger market. He put up a factory and, instead of working with his own hands to supply the limited needs of 300 people, employed an army of helpers to meet the unlimited requirements of the vast population which he could reach by rail.

It was in this way that our present great manufacturing enterprises were built up. It is this same agency which has made it possible for the farmer in the West to sell his grain in the East at a fair profit, instead of burning it at home for fuel because no market could be reached.

Period of Greatest Activity.

In 1830 the United States had only twenty-three miles of railway. By 1840 the mileage had increased to 2,818. How rapid the increase has been, and the periods in which there has been the greatest activity, is shown in the following official figures:

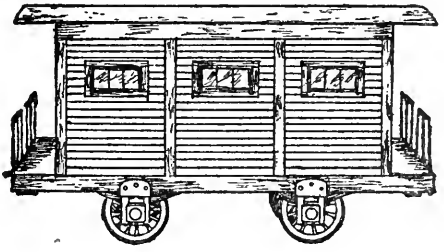
1830-1840— 2,818 miles.
1840-1850— 9,021 miles.
1850-1860— 30,635 miles.
1860-1870— 52,914 miles.
1870-1880— 93,296 miles.
1880-1890—163,597 miles.
1890-1900—193,346 miles.
1900-1915—251,984 miles.

It is significant of the intimate connection between railway construction and industrial and agricultural de-

velopment that the late years from 1900 to 1915 mark the period of greatest activity in all three lines.

The Progress Westward.

The year 1862 found railway communication with the Missouri River established, a line tapping that stream at St. Joseph's, which was then the most im-



An Old-Time Passenger Coach.

portant town on the river. Progress from Buffalo westward was slow. An important link in this system of rail communication was the Pontiac & Detroit line, completed in 1845. Another was the Detroit & St. Joseph Railroad, now the Michigan Central, a portion of which running to Ypsilanti, was opened in 1838.

Railroading was not without its tribulations in those days. A grand banquet was given at Ypsilanti when the road was formally opened, a special train conveying many distinguished guests from Detroit. On the return trip the one engine owned by the company broke down, and the train was hauled back to Detroit by relays of horses.

Earnings in the Early Days.

The Detroit & St. Joseph was a State road, and the progress of construction, earnings, etc., was watched with great interest. In its issue of May 19, 1838, the Detroit *Journal & Courier* contains this cheerful announcement:

"It is gratifying to know that the freight and travel on this State road are increasing rapidly. The average receipts for several days past have been upwards of $300. On Monday they were $326; Tuesday, $431; Wednesday, $310; and Thursday, $372."

In February, 1846, the road was completed to Kalamazoo; and, notwithstanding the gratifying showing in the way of earnings, the State, in the latter part of this year, having expended $1,954,308.28 on the road, decided to sell it to a railroad corporation organized to take it over, for $2,000,000. It required six years of further struggle to complete the road to Chicago.

Birth of Transcontinental Route.

It was in this manner, piece by piece, that the present great railway system of our country was built up. Small stretches of road were constructed by independent companies after the plan inaugurated in New York and Pennsylvania, and, after these had become reasonably well connected, the various roads were bought up and consolidated. At the time the Missouri was reached in 1862 there were about 32,000 miles of road in operation in all parts of the country.

The Civil War, and conflicts with the Indians in the West, demonstrated the need of a through transcontinental line for the speedy, certain movement of troops and supplies, as well as goods to and from San Francisco in case the seaports of the Atlantic and the Gulf should be effectually blockaded. It was this emergency which led to the building of the Union and Central Pacific roads.

How the Pacific Was Reached.

Conditions were not inviting for the investment of private capital. The country between the Missouri and the Pacific Coast was peopled mainly by hostile Indians. Traffic was naturally insignificant. But the exigencies of the time demanded a road, and to secure it the Federal government was forced to extend financial aid. This it did by issuing special bonds, the proceeds of which were used for the construction of the road. The money thus raised was to be paid back to the government in the hauling of troops and supplies, transportation of mails, transmission of telegraph messages, etc.

For many years the Pacific roads were far from profitable, but in time the country was settled, an immense traffic resulted, and finally the government claim was paid in full. Today there are five great American trunk lines in operation to the Pacific Coast, and one more in course of construction. Canada also has two through lines, and work on a third is being pushed rapidly.

Result of Railway Transportation.

Before the development of railway transportation, the great trade centers were naturally on the sea coast or rivers. Water transportation was cheap and easy, and trade followed the cheapest route. The seaports have retained their prominence, but, in many instances, the advantages gained by inland towns which were located on navigable waters have been to a great degree lost.

There was a time when St. Louis, by reason of its river trade, far out-ranked Chicago in commercial importance, but as the railways began to make the latter city a central headquarters it took on a phenomenal growth, and is today second only to New York in population, wealth, and volume of trade.

Rates on the Pioneer Roads.

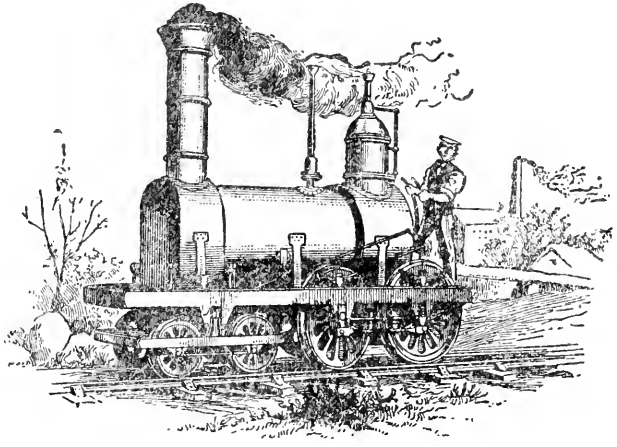
Reference has been made to the rates on the pioneer railways being much lower than those possible on stage coaches or carter's van, and that in this may be found the prime cause of the phenomenal growth of the United States. This is correct, but these rates were only relatively low. The shippers of today would be horror-stricken if asked to pay the same charges for railway transportation as were in effect from 1830 to 1850.

During the period named the rates for transporting goods by rail were *seven and one-half times greater* than those now in force. Where it now costs one dollar to transport a given amount of freight from New York to Chicago, the charge, up to 1850 and even later,

was $7.50, and even this was then looked upon as reasonable.

Speed in Ye Olden Time.

In the matter of speed there also has been a wonderful transformation. When the first line from Philadelphia to Pittsburg was built, in 1834, there was great



First Locomotive Built by Brooks in 1836.

rejoicing over the fact that the journey could be made in three and one-half days—84 hours. But this great feat was only possible after the road had been "improved," which was in 1837. Today a journey from Philadelphia to San Francisco may be made in the same time.

In those days, a person desiring to travel from Philadelphia to Louisville would go to Pittsburg by rail and there take passage in a "packet," a canal boat drawn by horses. Freight was sent over the same route.

Sixty years is a short period, comparatively speaking, but into the past sixty years have been crowded more progress in the matter of transportation by both land and water than can be recorded in the whole previous history of the world.

CHAPTER II.

ORGANIZATION OF OPERATING FORCE.

In the handling of transportation matters, the one prime requisite, aside from necessary equipment, is thorough organization of the operating force. We must, of course, have the equipment first, but unless this equipment is properly made use of the results will be far from satisfactory. In no line of transportation effort is this better shown than in railroading. The modern, well-managed railway or steamship line moves with the regularity and precision of watch mechanism. Its operating department is a huge human machine, composed of human cogs, each interfitting and performing a well-defined duty.

Organized Like an Army.

To secure unity of action toward the desired end the operating department is organized like an army. There is first a general-in-chief, a commander, who is there to carry out the desires of the people in whose service he is employed. The general of an army gets his instructions from the War Department, and the latter from Congress, which is representative of the people. The general manager of a railway or steamship line takes his orders from the president and chairman of the executive board; these represent the directors, and the directors in turn voice the desires of the stockholders. No soldier would think of going over the head of his

general to make suggestion or complaint to the War Department. Neither will a real railroad man dispute or disobey the orders of the general manager. Each official is supreme, so far as operations are concerned, and responsible only to his immediate superiors.

Organization of Union Pacific.

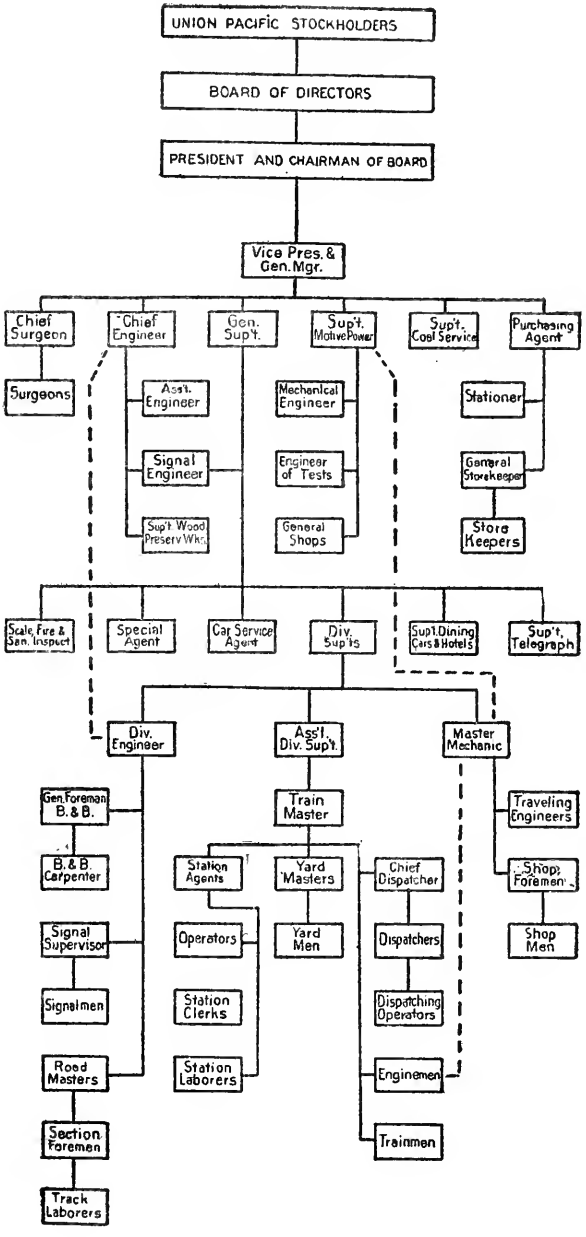
The method in vogue on the Union Pacific, which is accredited with being one of the best organized railway systems in the country, may be taken as illustrative of the latest and most effective plan of organization.

Here we find six general departments, the heads of which all report direct to the general manager. These six departments are those of general superintendent, chief engineer, superintendent of motive power, superintendent of coal service, purchasing agent, and chief surgeon.

Each of these officials in turn has under him well-organized departments, each with its responsible head, and these departments are again subdivided. Everywhere there is system, system so perfect that a missing coupling-pin can be located.

Duties of General Superintendent.

Next to the general manager the general superintendent is the most important official. He controls six sub-departments, consisting of division superintendents, car service agents, special agent, superintendent of telegraph, superintendent of dining cars and hotels, scale, fire and sanitary inspector.


UNION PACIFIC STOCKHOLDERS
BOARD OF DIRECTORS
PRESIDENT AND CHAIRMAN OF BOARD
Vice Pres. & Gen. Mgr.
Chief Surgeon
Chief Engineer
Gen. Sup't.
Sup't. Motive Power
Sup't. Cost Service
Purchasing Agent
Surgeons
Ass't. Engineer
Signal Engineer
Sup't Wood Preserv Wks.
Mechanical Engineer
Engineer of Tests
General Shops
Stationer
General Storekeeper
Store Keepers
Scale, Fire & San. Inspect
Special Agent
Car Service Agent
Div. Sup'ts
Sup't Dining Cars & Hotels
Sup't. Telegraph
Div. Engineer
Ass't. Div. Sup't
Master Mechanic
Gen. Foreman B. & B.
B. & B. Carpenter
Signal Supervisor
Signalmen
Road Masters
Section Foremen
Track Laborers
Train Master
Station Agents
Operators
Station Clerks
Station Laborers
Yard Masters
Yard Men
Chief Dispatcher
Dispatchers
Dispatching Operators
Enginemen
Trainmen
Traveling Engineers
Shop Foremen
Shop Men

It would be impossible for one man to give personal attention to all the operating details of an entire railway of any considerable size, so the road is usually cut up into divisions, at the head of each of which is a division superintendent who reports to the general superintendent, and to him only. To all practical purposes, so far as operation is concerned, each of these divisions is a separate and distinct road. The general superintendent, by keeping in close touch with conditions on each division, understands the situation on the entire line, and is thus in position to secure the results which his superiors expect.

Duties of Other Officials.

Before there can be successful operation, the road and its equipment must be in condition to operate. This is the duty of the general superintendent's collateral officials—they must get the road in condition for him to run. The engines and cars must be in shape for service—this is the duty of the superintendent of motive power; fuel is needed at convenient points—it is secured and distributed by the superintendent of coal service; the engineering department sees that the bridges, buildings, roadbed, etc., are in proper condition; the purchasing agent looks after the needed supplies, etc.

All of these services are essential to the success of the general superintendent. As a general rule, he has no direct control over these departments, but at the same time is largely dependent upon them. The heads of these various collateral departments report direct to the general manager.

What Division Superintendents Do.

Each division superintendent is supreme in his territory as to matters of operation, and responsible only to his chief. Under him are the following officials and their employees:

Assistant division superintendent, train master, master mechanic, division engineer, travelling engineers, general foreman, carpenters, station agents, yard masters, chief dispatcher, signal supervisor, signalmen, operators, yardmen, dispatching operators, enginemen, trainmen, road masters, section foremen, station hands, etc. He has control over everybody in any way connected with the actual operation of the road on his division.

In two instances—enginemen and division engineers—there is a division of authority in some instances, but this is unavoidable. If an engineman is wasteful in the matter of fuel, or careless in the handling of his engine, so as to invite expensive repairs, he will find himself in trouble with the superintendent of motive power. If a work of engineering out of the ordinary is to be done, the division engineer will be under the authority of the chief engineer, rather than of the division superintendent.

Routine of Railway Work.

If a track laborer discovers a defect of any importance in the roadbed which he cannot repair, he reports it to the section foreman. If it is beyond the ability of the latter to make good, or requires skilled men or materials, he calls on the road master. In unusually

serious instances the division engineer is called upon, and from him report may be made to the division superintendent. Generally the routine ends here, but sometimes there are emergencies in which the general superintendent must be consulted.

Every man has his place and well-defined duty. Whatever is within the line of this duty he must do. But there is a limit to this duty, beyond which he is not expected to go, except in cases of emergency, without consulting the official immediately above him in rank. It is by adhering closely to this system that the roadbed and equipment are kept in good condition, and trains moved with regularity. This is the field of the general superintendent.

Duties of General Freight Agent.

At the head of the freight department, and reporting direct to the general manager, is the general freight agent. It is his work to make rates that will secure traffic for his road and at the same time be remunerative to the company. He is in full charge of everything pertaining to freight, its receiving, forwarding, and delivery.

Under the general freight agent, and reporting direct to him, are the numerous sub-officials and clerks in the general freight office, the hundreds of agents who handle freight at initial and way stations. If a shipment is lost, delayed, or miscarried, the general freight agent, through some subordinate, must trace and locate it. Should a shipper make claim for an overcharge, it is the general freight agent who must investigate and make refund if the claim is substantiated. The claim

may never reach him personally—it probably will not—but one of his subordinates will attend to it.

Duties of General Passenger Agent.

In similar manner the general passenger agent, also reporting to the general manager, is in control of all the passenger business of the company. Every man or woman who sells tickets, or handles ticket money in any form, is subordinate to the general passenger agent. So are all the sub-officials, the clerks in the general office, the travelling and city passenger agents, and the men who get up excursions "to points of unusual interest."

Whenever an advertisement is printed in a newspaper, or a poster appears setting forth in big type and dazzling colors the attractions of some particular place or event on the line of the company, it is the work of the general passenger agent—not done by him in person, but by one of his most valuable and best-paid assistants, the advertising man.

Organization Must Be Thorough.

Everything connected with the successful operation of a railroad depends upon organization. If the organization is thorough and sound, the results will be good; if it is weak, or lacking in any important respect, disaster will follow. The strongest railroad or steamship company in the world can be wrecked by lack of systematic effort and conduct of its business. The end may be long delayed, but it will come eventually. Leaks, small at first but gradually increasing, until enormous

sums of money are lost, will occur; the roadbed will run down and equipment wear out. Patrons will become dissatisfied and transfer their business. When these conditions arise the result is easy to foresee.

Various Other Departments.

On all large transportation lines there are other departments, reporting either to the general manager, or some specially delegated vice-president. None of these, however, have anything to do with the *operation* of the road. They are usually clerical, legal or financial in their nature.

CHAPTER III.

RELATIONS OF CARRIER AND SHIPPER.

There is marked difference in the relations of carriers by water and carriers by rail as regards the shipper. In the case of water transportation the owner of the vessel assumes little or no liability beyond the simple carriage of the goods entrusted to him. He is not responsible for delays, loss by theft, damage in transit, or by the sinking of his vessel by storm, collision or accident, unless the loss is caused by design, gross carelessness or incapacity on the part of the master or crew. Shippers by water routes therefore almost invariably insure the goods they ship, provided the quantity is large enough to warrant the expense.

Liability of Railroads.

The common carrier on land, the railroad, is in a different position. By the express terms of the uniform bill of lading, endorsed by the Interstate Commerce Commission, a railway becomes responsible to the shipper, with certain reasonable exceptions, for the safe carriage and delivery of goods committed to its care for transportation. The opening paragraph of the official uniform bill of lading says:

"The carrier or party in possession of any of the property herein described shall be liable for any loss thereof or damage thereto, except as hereinafter provided."

This is broad and explicit enough to remove any doubt as to the liability of the carrier in case of loss. The shipper must deliver his freight for transportation in good condition, full weight, and properly packed. Once thus delivered to the custody of a railroad the responsibility of the shipper ends, and that of the carrier begins, terminating only when the freight is turned over to the consignee at point of destination.

When Railroads Are Exempt.

It is held that the railroad must protect property committed to its care for transportation, but there are certain conditions under which it can not extend this protection. These conditions of exemption are expressly stipulated as follows:

Damage or delay caused by the act of God, such as washout and fire by lightning stroke, confiscation by the public enemy, differences in weight caused by natural shrinkage or discrepancies in elevator weights, loss by strikes or riots, damage by fire when goods have remained uncalled for at point of destination more than forty-eight hours, or loss or damage of any kind on another line to which it may be necessary to transfer goods in order to complete the journey.

What Railroads Must Do.

With these exceptions the land carrier assumes toward the shipper the relation of an insurer. For an agreed upon charge it contracts to not only transport the goods, but to deliver them promptly and in good condition. If the railroad receipts for goods as being in good condition it must deliver them in similar good

condition to the consignee. This extends even to perishable commodities, provided they are so marked and properly packed. Should delay ensue en route owing to an act of God, a raid by an enemy, a strike or a riot, and the goods be spoiled in the delay, the railroad would not be liable for the loss. This is a chance taken by the shipper. But if the delay is one which might have been avoided by the exercise of due diligence or common sense on the part of the carrier's employees the railroad must settle the loss.

Loss Arising from Fire.

Should a fire occur from natural causes, either en route, or while the goods are still in the possession of the carrier (with the exception previously noted), the railroad must pay for them, the same as an insurance company would if it had issued a policy on them. To this extent the bill of lading is an insurance policy.

A shipped a quantity of baled hay by the B railroad. While being loaded into a car by B employees, it was set on fire by a spark from a pipe a bystander was smoking, and totally destroyed. B settled for the hay at the price then ruling at the point of shipment.

C shipped gasolene by the D road and neglected to attach a red warning label as the law requires. One of D's employees threw a lighted match in the vicinity of the gasolene. An explosion and total loss followed. D refused to pay the loss. C sued and was defeated, the courts ruling that he was guilty of contributory negligence in not attaching the warning label.

Liability Confined to Own Road.

A common carrier by rail is liable only for the safe transportation of passengers and freight over its own line. It frequently happens that, in order to reach the point of destination, a car has to be transferred from one road to another. A car of grain, for instance, is routed from Chicago via the Nickle Plate to some point on the West Shore road in New York. The Nickle Plate receives and receipts for the grain, but can transport it only to Buffalo, where it is turned over to the West Shore, which receives its pro rata of the freight charge. If an accident occurs between Chicago and Buffalo the shipper looks to the Nickle Plate for redress. If the damage is done between Buffalo and the point of destination, the responsibility rests with the West Shore.

Law of Principal and Agent.

The shipper has had no direct dealings with the West Shore. His transaction has been entirely with the Nickle Plate, and the bill of lading receipt issued by the latter is the only documentary evidence of shipment which the shipper holds. But this does not release the West Shore. In receiving the freight at Chicago the Nickle Plate acts as principal only over its own line. For the transportation from Buffalo to destination it acts in the capacity of agent for both the shipper and the West Shore road. It is well understood in law that a principal is bound by the acts of an agent, provided those acts are within the authority of the agent.

It is by general acceptance of this policy that through shipments are made possible. Should it be abandoned we would have to revert to the old system of making a new shipment at each transfer point, with its annoying delays and confusion.

Old Plan Slow and Expensive.

Take the case of a shipper in New York who desires to forward a carload of merchandise to St. Paul. If the old system were in vogue, each road operating independently of the others, the car would be taken over, say, the New York Central to Buffalo. There the Central would stop its own car, unload it, and turn the merchandise over to the Michigan Central, which would reload it in one of its cars. This operation would again be repeated at Chicago, where the Chicago, Milwaukee & St. Paul would take charge.

Thus there would be a breaking of bulk three times, with unavoidable delay and expense, each road into whose charge the merchandise passed issuing a receipt therefor.

How the Modern Plan Works.

Under the modern plan of having the various roads act as agents for connecting roads, there is no breaking of bulk, and a lot of delay and expense is avoided. The receiving road loads the merchandise into one of its cars, and this car goes through to destination, its seals unbroken, no matter how many different roads it may be necessary to haul it over in completing the journey.

The bill of lading first issued is the only one the

shipper receives, but every road over which the car travels in reaching its destination is bound by it, so far as responsibility for safe transit over its own line is concerned. A car might travel in safety over the New York Central, the Michigan Central and the Chicago, Milwaukee & St. Paul to St. Paul, and be destroyed in the freight yards at St. Paul. In such a case there could be no evasion of responsibility. The Chicago, Milwaukee & St. Paul would have to settle with the shipper.

Shippers Have Responsibilities.

Claims for damages are settled on the basis of the actual value of the property involved, unless the shipper in order to secure a low rate has purposely understated the value to the railroad, in which event the carrier is liable for the stated value only. Here comes in the bounden duty of the shipper to deal fairly with the carrier.

Should a shipper take out insurance on his own account, and a loss ensue, the carrier will have the benefit of this insurance if such carrier settles with the shipper, unless there is a special agreement to the contrary.

When it becomes necessary, through faulty work on the part of the shipper, to repack merchandise in transit, a carrier may have the work done at the expense of the shipper, adding cost of same to the freight charges.

Two Extremes of Liability.

A railroad was transporting a carload of fruit in the early fall when favorable weather conditions might

reasonably be expected. No provision was made to protect the fruit from freezing, as it was at a time of year when frosts were unheard of. During the journey the weather changed suddenly, there was a sharp freeze, and the fruit was ruined.

Efforts on the part of the shipper to collect damages from the carrier were defeated in every court, from that in which trial was had to the supreme bench. The ruling in all was the same—the frost at that time of year was an unexpected act of God, which could not be provided against.

In another instance, fruit, properly packed and marked, was shipped late in the fall when freezing weather was at hand, and was destroyed in transit. It was shown that the employees of the carrier allowed the stove fires to die out en route, and the shipper obtained a verdict against the carrier.

Liability of Carriers by Water.

As a general proposition, wilful design or neglect on the part of the master of a vessel or its crew must be shown before there can be recovery for loss or damage. The broad difference between the liability of rail and water carriers is made because of the supposedly greater risks and dangers attendant upon water travel. It is argued that the shipper by water is conversant with these risks, gets the benefit of low rates for transportation, and if he wishes protection against loss, is in position to obtain it by insurance.

Where liability does attach to a vessel, the amount of such liability is limited to the actual value of the vessel and the freight.

Liability of Vessel Owners Limited.

It frequently happens that a vessel is owned by several individuals. In such case no owner can be held liable to a greater amount than his share of ownership bears to the total value of the vessel. If a vessel is worth $100,000 and A owns a $10,000 share, his pro rata of any loss which might occur would be one-tenth of such loss. If the loss were $25,000, A's share would be $2,500. This limitation is fixed by Federal statute.

Should an owner or master deliberately wreck or otherwise destroy a vessel in order to collect the hull insurance (as has often been done), or for any other purpose, the owner would undoubtedly be liable for losses which might be sustained by shippers.

Incompetency Begets Liability.

Aside from this, very little liability attaches to carriers by water, except that arising from gross carelessness or incapacity. Should the owners of a vessel send it on a voyage in charge of an incompetent master, or with an ignorant, inadequate crew, "short-handed," as sailors say, there would be liability. But the burden of proof as to this incompetency or inadequacy would rest with those who sought to recover damages.

The Federal statute describes how certain dangerous freights shall be packed and marked for transport, and expressly prohibits the transportation of such freights by passenger craft under any conditions.

Defined by Federal Statute.

How closely the liability of carriers by water is defined, may be seen in the following excerpt from the Federal statute governing navigation:

SEC. 3.—That if the owner of any vessel transporting merchandise or property to or from any port in the United States of America shall exercise due diligence to make the said vessel in all respects seaworthy and properly manned, equipped, and supplied, neither the vessel, her owner or owners, agent, or charterers shall become or be held responsible for damage or loss resulting from faults or errors in navigation or in the management of said vessel nor shall the vessel, her owner or owners, charterers, agent, or master, be held liable for losses arising from dangers of the sea or other navigable waters, acts of God, or public enemies, or the inherent defect, quality, or vice of the thing carried, or from insufficiency of package, or seizure under legal process, or for loss resulting from any act or omission of the shipper or owner of the goods, his agent or representative, or from saving or attempting to save life or property at sea, or from any deviation in rendering such service.

Should the master of a freight-laden craft meet a disabled vessel at sea and the rescue of passengers or crew from the latter be advisable, the master of the rescuing craft would have authority under this clause to dump overboard any part or all of his cargo, if necessary, and the owners thereof could not recover for the loss unless they had the goods insured. Likewise a master, in case of storm or other disaster, would have the right to jettison (throw overboard) his cargo in an effort to save his ship, and no liability for damages would attach to his act.

Liability for Improper Handling.

Carriers by water must exercise due care in the handling of freights as regards loading, stowing in vessel

and delivery. Loss occasioned in the improper or careless handling of freights while being loaded or unloaded, or resulting directly from improper stowage, is recoverable. On this point the Federal statute says:

It shall not be lawful for the manager, agent, master, or owner of any vessel transporting merchandise or property from or between ports of the United States and foreign ports to insert in any bill of lading or shipping document any clause, covenant, or agreement whereby it, he, or they shall be relieved from liability for loss or damage arising from negligence, fault, or failure in proper loading, stowage, custody, care, or proper delivery of any and all lawful merchandise or property committed to its or their charge. Any and all words or clauses of such import inserted in bills of lading or shipping receipts shall be null and void and of no effect. [The provisions of this section are not applicable to the transportation of live animals, by section 7 of this act.]

CHAPTER IV.

MAKING RATES AND FARES.

In making railroad rates to meet competitive conditions, some localities are certain to receive more favorable treatment than others. These discriminations, however, between persons, places and different commodities must be reasonable. The rates must be just to all concerned. The railroads must not so discriminate against any place as to prevent its healthy development.

The Government regulation of rates is designed principally to prevent the competitive struggles of railroad companies from resulting in unreasonable discriminations in rates. It is one of the functions of the State to see that all localities and shippers are treated with absolute justice.

There is no mathematical formula by which "reasonable" rates may be determined, but it is certain that rates cannot be fixed lower than the extra cost resulting from the performance of the particular services for which the charges are made. If the State, or any other authority, were to fix rates below that point, it would soon destroy the value of the railroad property. Nor can the railroad charges justly be greater than the value of the service to the shipper or traveler. If the railroads made the rates higher than the value of the

service, the inevitable result would be that traffic would fall off.

Thus it will be seen that the minimum rate below which the railroad charges cannot go is determined by the additional cost of performing a particular service; while the maximum beyond which they cannot go is fixed by the value of the service. The "reasonable rate" lies somewhere between these two extremes, and it "must be determined for each class of traffic or each important commodity with reference to measurable costs of service, and with regard to the value of the article." It will be readily seen, therefore, that the actual fixing of rates by traffic officials and their regulation by Government authority necessarily depend upon the exercise of human judgment. They are not governed by mathematics.

Importance of Freight Rates.

The making of freight rates is more important than the fixing of passenger fares, and the conditions governing the two are vastly different. It is much easier to fix and enforce passenger fares than it is to determine freight rates, while the policy of the railroad company with regard to the latter is of the highest importance.

No less than 70 per cent of the total income of American railroads is derived from the freight services, and only a little over 20 per cent from passenger business. The other 10 per cent of the revenue comes from the transportation of mail and express and from "other sources."

The first step in freight rate making is the classification of freight. Every railroad company is called upon to transport thousands of different kinds of articles. It is therefore necessary to group these articles into a limited number of classes and to base the rates as far as possible upon classes instead of upon individual articles.

Over one-half (54 per cent) of the great volume of traffic carried by the railroads of the United States is made up of minerals, mainly coal and iron ore. In no other country of the world is the mineral traffic so great as in the United States, and as this traffic must be carried at low freight rates, the average earning of the railroads for carrying a ton of freight one mile is less in this country than elsewhere. Manufactures make up a little more than one-seventh of the total tonnage, forest products one-ninth, and agricultural products one-twelfth. These four commodities constitute over 90 per cent of the total traffic, the remainder being made up of animal products, general merchandise and miscellaneous articles.

Freight Classification.

In these few groups of commodities more than ten thousand distinct kinds of articles are included. It would be impossible, of course, to make a rate for each of the ten thousand articles, and it is therefore necessary to group the articles into a small number of classes and to make the rates vary by classes instead of by articles. It is also necessary, or at least

desirable, that the railroad should give lower rates on commodities shipped in carloads than when they are handled in less than carload lots. These conditions are met by the freight classifications, which group the commodities into from ten to fourteen classes, giving to most articles a lower classification, and therefore a lower rate, when they are shipped in carload lots. The methods of classification are treated elsewhere. (See chapter on "Classification of Traffic.")

Commodity Tariffs.

There are some articles of freight, however, that are not included in the general classification. These are commodities that are invariably handled in carload quantities, such as coal, lumber, livestock, grain, cement, and other bulky freight. Such commodities are each given what is called a "commodity tariff rate," and they are known in the railroad business as "ex-class freight." The number of commodities thus designated is quite large—about 1,500, taking the country as a whole—but the great majority of articles of freight are included within the classifications.

Rate-Making Officials.

The making of freight rates is a task belonging to the traffic department of the railroad, headed usually by a vice-president of the company. Under this official, in a large company, is a freight traffic manager and a passenger traffic manager. The general freight agent

SECTION No. 1

(See page 19 for application)

Item No. 1. **CLASS RATES**

Will not apply on traffic requiring refrigerator space on steamers

On shipments for which no commodity rate is named in SECTION No. 2 to points designated below, the following Class Rates, governed by Western Classification No. 51, I. C. C. No. 9, issued by F. J. Hoffmann, Agent, supplements thereto and reissues thereof, will apply.

FROM

ALL POINTS DESIGNATED ON PAGES 7 TO 13, INCLUSIVE OF TARIFF AS TAKING B AND C RATES

ARTICLES

Minimum weight, Carloads, 30,000 pounds, except as otherwise provided herein.

NOTE—When via C. M. & St. P., Ry., Seattle or Tacoma, Wash., except when otherwise provided through rates named will not apply on pieces weighing over 10,000 lbs. On pieces weighing over 10,000 lbs. export rates shown to Seattle, Tacoma, Wash., will be applied, plus ocean rates named in Note 7. When via M. St. P & S. S. M. and Canadian Pacific Rys., via Vancouver, B. C., except where otherwise provided, through rates named will not apply on pieces weighing over 5,000 lbs., or measuring 12 feet by 8 feet, by 5 feet, when destined to Sydney, Aust., Suva, Fiji Islands or Auckland, New Zealand, or will not apply on pieces weighing over 10,000 lbs. or measuring 12 feet by 8 feet, when destined to Yokohama, Kobe, Nagasaki, Moji, Japan; Shanghai, Hongkong, China, or Manila, P. I. On pieces weighing over 5,000 lbs., or measuring 12 feet by 8 feet, by 5 feet, when destined to Sydney, Aust., Suva, Fiji Islands or Auckland, New Zealand, and on pieces weighing over 10,000 lbs., or measuring 12 feet by 8 feet, when destined to Yokohama, Kobe, Nagasaki, Moji, Japan; Shanghai, Hongkong, China, or Manila, P. I., export rates shown to Vancouver, B. C., will be applied plus ocean rates named in Note 13.

RATES IN CENTS PER 100 LBS. (Except as otherwise noted)

	When destined to or consigned through to ⓦYokohama, Kobe, Nagasaki, Moji, Japan; Shanghai, Hongkong, China; Manila, P. I.			When destined to or consigned through to Sydney, Australia; ⓢSuva, Fiji Islands; Auckland, New Zealand.		
	Export Rates To		Through Rates To ⓦYokohama, Kobe, Nagasaki, Moji, Japan; Shanghai, Hongkong, China; Manila, P. I.	Export Rates To		Through Rates To Sydney Australia; ⓢSuva, Fiji Islands; Auckland, New Zealand
	Via Vancouver, B. C., M. St. P. & S. S. M. and Canadian Pacific Rys.	Via Seattle and Tacoma, Wash.	Via M. St. P. & S. S. M. and Canadian Pacific Rys. (See Notes 1, 6, 10, 11) / Via C. M. & St. P. Ry. (See Notes 2, 9, and 11.)	Via Vancouver, B. C., M. St. P. & S. S. M. and Canadian Pacific Rys.	Via Seattle and Tacoma, Wash.	Via M. St. P. & S. S. M. and Canadian Pacific Rys. (See Notes 4, 5, 9, 11, and 13) / Via C. M. & St. P. Ry. See Notes 3, 9 and 11.
Four Times First Class			♦Cancel—Combination rates will apply.			
Points in Group A	8 64		14 40	9 60		14 40
Points in Group B	8 40		14 00	9 33		14 00
Three and One-Half Times First Class			♦Cancel—Combination rates will apply.			
Points in Group A	7 56		12 60	8 40		12 60
Points in Group B	7 35		12 25	8 17		12 25
Three Times First Class			♦Cancel—Combination rates will apply.			
Points in Group A	6 48		10 80	7 20		10 80
Points in Group B	6 30		10 50	7 00		10 50
Two and One-Half Times First Class			♦Cancel—Combination rates will apply.			
Points in Group A	5 40		9 00	6 00		9 00
Points in Group B	5 25		8 75	5 83		8 75
Double First Class			♦Cancel—Combination rates will apply.			
Points in Group A	4 32		7 20	4 80		7 20
Points in Group B	4 20		7 00	4 67		7 00
One and One-Half Times First Class			♦Cancel—Combination rates will apply.			
Points in Group A	3 24		5 40	3 60		5 40
Points in Group B	3 15		5 25	3 50		5 25
First Class			♦Cancel—Combination rates will apply.			
Points in Group A	2 16		3 60	2 40		3 60
Points in Group B	2 10		3 50	2 33		3 50
Second Class			♦Cancel—Combination rates will apply.			
Points in Group A	1 86		3 10	2 07		3 10
Points in Group B	1 82		3 03	2 02		3 03
Third Class			♦Cancel—Combination rates will apply.			
Points in Group A	1 56		2 60	1 73		2 60
Points in Group B	1 51		2 52	1 68		2 52
Fourth Class			♦Cancel—Combination rates will apply.			
Points in Group A	1 32		2 20	1 47		2 20
Points in Group B	1 29		2 15	1 43		2 15

♦Advance.

ⓦAt Yokohama, Japan, cargo is unloaded direct into Customs sheds when shipped via Canadian Pacific Royal Mail Steamers, or via Toyo Kaisha Kisen Steamers.

ⓢRates to Suva, F. I., apply via Vancouver, B. C., in connection with M. St. P. & S. S. M. and Can. Pac. Rys., and Canadian Australian Royal Mail Steamship Co., only.

For explanation of abbreviations, notes, rules and application of rates, refer to pages 15 to 21 incl.

Sample Page of Joint Export Tariff, Section 1—Class Rates from Stations in Eastern Territory to Pacific Terminals (Western Classification).

is a subordinate of the former. In the largest systems the work is subdivided and there are two general freight agents, one in charge of local traffic and the other of through traffic. Sometimes there is a third agent in charge of coal traffic.

The general freight agent is the official who actually makes the rates and prepares and issues the rate sheets. These are signed by him and also by the freight traffic manager. The latter controls the general policy of rate making, consulting with the traffic vice-president on important questions of policy. Only the most vital points of traffic policy are brought to the attention of the president and board of directors.

The information on which the rates are based is gathered from a variety of sources, including the division freight agents and freight solicitors. Rate making demands a knowledge of innumerable details regarding the territory to be served and the actual conditions of business therein.

Making Local Freight Rates.

In making rates on local traffic, that is, traffic local to the lines of any one company, the general freight agent prepares and issues rate sheets without reference to competing carriers. All rates on interstate traffic must be filed with the Interstate Commerce Commission at Washington and they do not become effective until 30 days after being thus filed. In the case of the great coal carriers the making of coal rates is one of the functions of the general coal freight agent, the

method of procedure being similar to that used in fixing charges for all other kinds of traffic.

Making Competitive and Through Rates.

In fixing competitive and through rates, the rate sheets are not issued by the general freight agent or traffic manager until after consultation with the traffic officials of competing railroads. Meetings of the various traffic associations afford an opportunity for conferences in regard to such rates. All railroad companies belong to one or more of these associations. Since 1897, when the United States Supreme Court decided that the fixing of competitive and through rates by the traffic associations themselves was a violation of the anti-trust law, it has been necessary for each railroad company to act independently in making its rates. But competing and connecting lines are usually consulted and the rates are informally fixed at the meetings of the associations. These rates are then published by the individual companies. No attempt is now made, as prior to 1897, to enforce the rate agreements by fines and penalties assessed by the traffic associations against offending members.

The Percentage Tariff System.

In the Central Traffic Association territory east of the Mississippi and north of the Ohio and the Potomac, the through rates on classified traffic over competing lines are worked out by taking as a basis the rate from Chicago to New York by the shortest line. Under

what is known as the "percentage tariff system," east-bound class rates to New York from points other than Chicago are fixed percentages of the rate from Chicago to New York. Similarly, on west-bound class rates, the rate from New York to Chicago is taken as the basis, and the rates from New York to points other than Chicago are fixed percentages of this base rate.

The Basing Point System.

Another system of rate making prevails in the territory south of the Ohio and east of the Mississippi. This is known as the "basing point system." The rate to each of the larger cities on competing roads is taken as the basis of the rates to local points adjacent to such centers. The larger cities of the South where competition prevails are called "basing points," the rates at these points being fixed subject to the competition of alternate routes. The rule then is that the rate from a distance to local towns near a basing point city is the sum of the rate to the basing point, plus the local tariff from the basing point to the local town.

Thus the freight rate from Philadelphia to a town, say twenty-five or fifty miles from Atlanta, Ga., is the rate from Philadelphia to Atlanta, plus the rate from Atlanta to the nearby town; and should this town be nearer Philadelphia than Atlanta is, the rate is higher than that to Atlanta, although it is a shorter haul. While this seems to be a discrimination against the local point, it has been held to be legal because of the greater competition at Atlanta, the basing point. This system of rate making is the principal feature of

the Southern rate policy, and applies to nearly all of the Southern territory.

The Blanket System of Rate Making.

Competition is keen for traffic taking the long haul between Atlantic Coast territory and the Pacific Coast region, and this competition is of two kinds. The transcontinental railroads actively compete for this business and they also have to meet the competition of steamship lines operating between the two seaboards. This competition has been intensified by the opening of the Panama Canal to commercial traffic (August, 1914).

The effect upon transcontinental rates is two-fold: First, a lower rate is given from points east of the Missouri River to the Pacific Coast states than is given to places on the way west situated in the states like Utah and Nevada, immediately east of the Pacific Coast states. The competition of steamship lines is directly responsible for this lower rate on the longer haul to the Coast.

Second, the rate to the Pacific Coast terminals, from Seattle to San Diego, is the same from all points east of the Missouri River. Thus, on nearly all classes of freight the rate from New York to San Francisco is no higher than that from St. Louis or Kansas City.

This system of rate making is known as "the blanket system," the entire territory east of the Missouri River being covered, or "blanketed," by the same west-bound rate.

In the case of traffic from any point east of the

SECTION No. 2—Continued

FROM

ALL POINTS DESIGNATED ON PAGES 7 TO 15 INCLUSIVE

(Except as Noted Below)

ARTICLES

Minimum weight, Carloads, 30,000 pounds, except as otherwise provided herein.

NOTE—When via C. M. & St. P. Ry., and Seattle or Tacoma Wash., except where otherwise provided, through rates named will not apply on pieces weighing over 10,000 lbs. On pieces weighing over 10,000 lbs. export rates shown to Seattle, Tacoma, Wash., will be applied plus ocean rates named in Note 7. When via M. St. P. & S. M. and Canadian Pacific Rys., via Vancouver, B. C., except where otherwise provided, through rates named will not apply on pieces weighing over 5,000 lbs., or measuring 12 feet by 8 feet, by 5 feet, when destined to Sydney, Aust., Suva, Fiji Islands or Auckland, New Zealand, or will not apply on pieces weighing over 10,000 lbs., or measuring 12 feet by 8 feet, when destined to Yokohama, Kobe, Nagasaki, Moji, Japan; Shanghai Hongkong, China, or Manila, P. I.. On pieces weighing over 5,000 lbs., or measuring 12 feet by 8 feet, by 5 feet, when destined to Sydney, Aust., Suva, Fiji Islands or Auckland, New Zealand, and on pieces weighing over 10,000 lbs., or measuring 12 feet by 8 feet, when destined to Yokohama, Kobe, Nagasaki, Moji, Japan; Shanghai, Hongkong, China, or Manila, P. I., export rates shown to Vancouver, B. C., will be applied, plus ocean rates named in Note 13.

ITEM NOS.		CARLOADS OR LESS CARLOADS.	RATES IN CENTS PER 100 LBS. (Except as otherwise noted)							
			When destined to or consigned through to ⑯Yokohama, Kobe, Nagasaki, Moji, Japan; Shanghai, Hongkong, China; Manila, P. I.				When destined to or consigned through to Sydney, Australia; ㉑Suva, Fiji Islands; Auckland, New Zealand.			
			Export Rates To		Through Rates To ⑯Yokohama, Kobe, Nagasaki, Moji, Japan; Shanghai, Hongkong, China; Manila, P. I.		Export Rates To		Through To Rates Sydney Australia; ㉑Suva, Fiji Islands; Auckland, New Zealand	
			Vancouver, B. C. Via M. St. P. & S. M. and Canadian Pacific Rys.	Seattle and Tacoma, Wash. Via C. M. & St. P. Ry.	Via M. St. P. & S. M. and Canadian Pacific Rys. (See Notes 1, 8, 10 and 11.)	Via C. M. & St. P. Ry. (See Notes 2, 9, 10 and 11.)	Vancouver, B. C. Via M. St. P. & S. M. and Canadian Pacific Rys.	Seattle and Tacoma, Via C. M. & St. P. Ry.	Via M. St. P. & S. M. and Canadian Pacific Rys. (See Notes 4, 5, 11 and 12.)	Via C. M. & St. P. Ry. (See Notes 3, 5, and 11.)
35	Bicycles, boxed or crated, min. wt. 20,000 lbs.	C. L.	135	126 4	195	195	.....	.....	.....	.....
40	Books	L. C. L.	120	120	200	200	133	133	200	200
45	Boots and Shoes, not otherwise specified, boxed	L. C. L.	155	165	275	276	183	183	275	276
50	⑯Bowling Alley Tracks or Floors and Cushions for same and Racks for returning Balls, Automatic Bowling Alleys and Ten Pin Spotters, K. D., boxed or crated; also Ten Pine, Balls and Score Boards. ⑯Provision for Bowling Alley Track will apply on sections of track bolted together.	L. C. L.	75	75	125	125	.....	.....	.....	.....
55	Butter, Butterine, Oleomargarine, Eggs, Cheese and Dressed Poultry in packages, min wt. 24,000 lbs. When for refrigerator space on steamer	C. L.	.....	.....	.....	.....	.....	♦㉓	.....	♦㉓
60	Butter and Butterine, in tins, boxed, min. wt. 24,000 lbs. When for ordinary stowage on steamer	C. L.	.....	.....	.....	.....	.....	♦㉓	.....	♦㉓
62	Carbide of Calcium, in Tin Cans, boxed or in iron drums, minimum weight 50,000 lbs.	C. L.	.....	50	.....	㉒㉔70	.....	.....	.....	.....
65	Canned Goods, viz.: Fish, Fruits (not Preserves), Meats (including Potted or Deviled), Vegetables, Baked Macaroni and Cheese, Soups, Breads and Puddings, in hermetically sealed cans, boxed, min. wt. 40,000 lbs.	C. L. L. C. L.	80 110	80 110	95 145	95 145	83 97	83 97	110 145	110 140
70	Canned Meats, or Meat in glass, hermetically sealed (including Potted or Deviled), boxed, straight or mixed C. L., min. wt. 40,000 lbs.	C. L. L. C. L.	55 110	55 110	90 145	90 145	83 97	83 97	110 145	110 145
71	Cards, playing, boxed, minimum weight 20,000 lbs.	C. L.	•100	100	•130	130	.....	.....	.....	.....
72	Car Springs, C. L., min. wt. 70,000 lbs	C. L.	.....	47	.....	60	.....	.....	.....	.....
75	Cash Registers, Cash Register Parts and Automatic Carriers, boxed, min. wt. 24,000 lbs. Note—Check Paper (for Cash Registers) may be shipped in mixed carloads with Cash Registers.	C. L. L. C. L.	 105	 105	 175	 175	94 117	94 117	125 175	125 175
80	Cereal Breakfast Foods, including Flake Maize and Shredded Wheat Biscuit, in packages	C. L. L. C. L.	 84	 84	 140	 140	75 93	75 93	110 140	100 140
85	Crackers, Matzos and Matzos Meal, Cakes, Fruit Biscuits, Pretsels, and Toast and ㉑Shredded Wheat Biscuit, in boxes or barrels, or in baskets or tubs with tight wooden covers, or in tin cans, crated	C. L. L. C. L.	110 170	110 170	160 220	160 220	120 147	120 147	160 220	160 220

♦Advance. •Reduction.

⑯At Yokohama, Japan, Cargo is unloaded direct into Customs sheds when shipped via Canadian Pacific Royal Mail Steamers, or via Tokyo Kisen Kaisha Steamers.

㉑Rates to Suva, Fiji Islands, apply via Vancouver, B. C., in connection with M. St. P. & S. S. M. and Can. Pac. Rys. and Canadian-Australian Royal Mail Steamship Co. only.

㉒Rates named in this item will not apply on L. C. L. shipments of Shredded Wheat Biscuit; for rates refer to item No. 80.

㉓Applies only in connection with the Bank Line. ㉔Rates will only apply to Kobe, Japan, and Manila, P. I.

㉕Cancel—Class rates will apply.

For explantion of abbreviations, notes, rules and application of rates, refer to pages 15 to 21 incl.

Sample Page of Joint Export Tariff, Section 2—Commodity Rates from Stations in Eastern Territory to Pacific Terminals (Western Classification).

Missouri River to an intermediate point, say a town in Nevada east of the Sierra Nevada Mountains, the rate is fixed according to the following rule: To the blanket rate from the eastern point of shipment to the nearest Pacific terminal add the local rate from that terminal to the Nevada town. Thus again we see that the rate for the shorter haul is greater than that for the long haul to the Coast.

On east-bound transcontinental traffic the rates are not blanketed over so large an expanse of territory in the East as they are on traffic moving to the West. Local or distance tariff rates prevail from the Pacific terminals to points on the Missouri River, and all places in the territory between the Missouri and Mississippi rivers pay a fixed sum or differential above the rate to the Missouri River. All places between the Mississippi River and Chicago pay the same differential above the rate to the Mississippi. For points between Chicago and Pittsburgh the rate is again increased by a fixed sum, and the rates to points between Pittsburgh and the Atlantic seaboard are a fixed amount above the rate to Pittsburgh. It will therefore be seen that the rates from the Pacific Coast to points east of the Missouri River are in reality graduated by the zone system, with which the country has been familiarized by the operation of the Parcel Post.

How Passenger Fares Are Fixed.

The making of passenger fares is the function of the general passenger agent of the railroad, who, in

large companies, is under the immediate supervision of a passenger traffic manager. The general passenger agent decides upon and issues the schedules of fares. If these apply only upon the local lines of the company, they are usually made without consulting competing or connecting lines; but if the fares apply to competitive traffic, in which rival lines are interested, such fares are submitted to the passenger traffic association, through which they are considered by all the lines interested. An informal agreement being reached by the members of the association in interest, the general passenger agent then files the rate sheets for his company with the Interstate Commerce Commission and they become effective at the expiration of thirty days. Thus the action of each company in rate making, while nominally independent, is the approved result of consultation by all the interested lines.

Special fares of many kinds, including commutation and excursion fares, are fixed independently by each company where the traffic is local to its own lines. In the case of convention rates, etc., involving competing and connecting lines, the usual course of consultation with the rival companies is followed.

CHAPTER V.

DOMESTIC AND FOREIGN RATES.

There always has, and always will be, dissatisfaction with railway rates for both passenger and freight transportation. No man has as yet been able to devise a generally acceptable tariff in either line. In one respect only is satisfaction expressed, and this is because the tendency is ever downward.

People do not invest their money in the construction of railroads or other transportation lines from motives of philanthropy. The one all-dominant question precedent to investment is "will it pay?" In this connection, it is well to bear in mind that all things, transportation lines as well as babies, are not born fully developed. Railroads have their periods of infancy, in which they require careful nursing the same as children do. For this reason it is impracticable to treat all railroads, the fully developed and the partly developed, alike.

Rates on the Pioneer Roads.

A railroad which runs through a wild, sparsely settled country cannot possibly thrive on the same rates which another line would find profitable in a populous territory.

Ample illustration of this is to be had in the history of American and Canadian railroading, dating from 1830. The initial lines did not make any money on rates that were seven and one-half times higher than those

now in effect. Large as these rates were, however, they tended to promote the building up of communities, until the roads not only did a profitable business, but were enabled by reason of this increase of business to keep on making reductions in their rates. Today the transportation lines of the United States and Canada give a better service for less money than is to be found in any other part of the world. The charge for the transportation of passengers and freight is not only much less, and the accommodations much better, than abroad, but the workmen on American and Canadian railways are much better paid than the toilers on foreign roads.

As Regards Passenger Rates.

Not long ago William J. Bryan made a trip abroad, and on his return to this country spoke and wrote entertainingly on conditions abroad. There was one thing, however, he did not touch upon, and that was railroad rates and wages. In commenting upon this omission, Mr. W. C. Brown, president of the New York Central lines, says:

"Mr. Bryan could have told us that on his trip from Liverpool to London, a distance of 200 miles, his fare, including 150 pounds of baggage, was $5.50, while the fare from Boston to Albany, 201 miles, is $3.80. He could have found, by inquiry, that the engineers who pulled the train from Liverpool to London were paid $2.00, while the men who run the engines, Boston to Albany, receive $7.60 for substantially the same mileage, with firemen, conductors and brakemen all receiving fair proportionate pay."

American Vs. English Rates.

Passenger rates in the United States are 24 per cent less, and the pay of trainmen 177 per cent higher, than in England. Here are the figures:

Route.	Mileage.	Fare.	Engineer's Pay.
Liverpool-London	200	$5.50	$2.00
Boston-Albany	201	3.80	7.60
London-Edinburgh	400	13.92	6.00
New York-Buffalo	440	11.25	16.40

In Canada the rates vary from an average of 1.054 cents per mile on the Canadian Northern of Quebec (this is the lowest) to 9.427 cents on the British Yukon route. The average, as given by Mr. J. L. Payne, comptroller of the Department of Railways and Canals, is 1.921 cents per mile.

Average Rates on Leading Lines.

There is a widespread impression, fostered by men who are quoted as authorities, that transportation rates are lower abroad than on the American continent. In no way can this assertion be substantiated except by comparing the first-class service of the United States and Canada with the third-class service abroad. Following will be found a fair average of the passenger rates prevailing in various prominent countries:

United States—The average passenger rate on the leading railroads is 2¼ cents a mile. This is for service on first-class trains. In New York State a flat rate of 2 cents per mile is in force, but in many well-settled portions of the country a 3-cent rate prevails. There are some sparsely settled sections in which 4, and even

as much as 5, cents per mile is charged. On the other hand, many regular patrons of railroads are carried for 1 cent a mile through the use of commutation tickets.

English and French Passenger Rates.

In England the rates, translated into the equivalent of American money, are 4 cents per mile for first class; 2½ cents second class, and 2 cents for third class. There is a large sale of special rate excursion tickets, but the cheapest regular rate for the lowest class of service is only a fraction less than is charged on the American-Canadian roads for the best.

French roads charge 4.7, 2½ and 1.6 cents per mile for first, second and third-class accommodations. In both England and France the transportation charge for first-class passengers is nearly double that prevailing in the United States and Canada.

In Prussia, Austria and Hungary.

Passenger fares in Prussia are lower than in England or France, and yet considerably higher than in this country. The average is 3.06 cents first class, 2.3 cents second class, and 1.53 third class. There is a still lower rate—0.77 cents—for what is known as fourth-class service, but it is available only on slow trains.

In Hungary and Austria the zone system prevails, and there is no charge by the mile. On through traffic the charge for Zone No. 1 (fifteen miles or less) varies from 16.1 to 48.3 cents, according to class. This would be about 3 1/5 cents per mile for first-class tickets. In Zone 13, distance up to 140 miles, the first-class charge

is $6.76. Here we have an increase to nearly 5 cents a mile. The Austria-Hungary tariff is evidently compiled on the theory that people who can afford to travel considerable distances must pay more proportionately than the shorthaul riders. The carriage of baggage constitutes an extra charge.

Cheap Fares in India.

India offers the lowest rate of passenger transportation in the world—the charge for third-class service is one-half cent a mile. Few civilized people, however, would care to ride on the third-class India trains. They are patronized almost exclusively by the lower classes of natives. The trains move very slowly, and the coaches are overcrowded, without regard for either decency or comfort.

In all foreign countries the bulk of the passenger traffic is of the third-class, and the average haul per passenger is comparatively short. In the United States and Canada the great bulk of the travel is first-class, and journeys of from 500 to 1,000 miles are made by a larger percentage of the travelers than elsewhere.

Freight Rates Also Lower.

To even greater degree the same conditions hold good as regards freight rates. In no other part of the world can the service given by the American-Canadian lines be duplicated for speed and cheapness. It is impossible to give comparative figures, as the rates are made solely on classes, and the articles entering into the make-up of these classes vary greatly in different sections of the country.

The first-class freight rate from Chicago to New York, a distance of 1,000 miles, is $15 per ton. This is 1½ cents per ton per mile, which is the highest. Grain is carried the same distance for $3.20 per ton, which is about one-third of a cent per ton per mile.

Freight Rates Going Down.

Mr. Emory R. Johnson, in his work on "American Railway Transportation," gives the average freight revenue per ton per mile received by the United States railroads in 1901 as three-quarters of a cent. The tendency is ever downward. The average ton mile charge in 1901 was barely 40 per cent of that in effect in 1871. From 1871 to 1881 there was a decrease of one-third in rates. From 1881 to 1891 the decrease was 25 per cent.

The lowest rate ever known was in 1899, when, owing to business depression, the average charge per ton per mile was 0.724 cent. Now, after years of golden prosperity, it is about 0.750 cent.

In England the average is 2 cents per ton per mile; France, 1.55 cents; Germany, 1.42 cents; Prussia, 2.30 cents.

Effect of Ten Per Cent Increase.

An increase in freight rates is always made the subject of protest by shippers on the ground that it will force them to ask a higher price for their goods than consumers can afford to pay. Few people, however, realize what little actual difference a 10 per cent advance really makes.

A paper company at Housatonic, Mass., makes a certain grade of paper which sells at $12 per 100 pounds.

Freight rates, by the carload, to the three principal distributing points are: New York, 15 cents; Chicago, 35 cents; St. Louis, 41 cents. Suppose these rates are advanced 10 per cent. The freight charge would then be: New York, 16.50 cents; Chicago, 38½ cents; St. Louis, 45.1-10 cents. In other words, a 10 per cent advance in freight would add 1½ cents to the price of the $12 package in New York, 3½ cents in Chicago, and 4 1-10 cents in St. Louis.

Hardly Noticeable to Consumer.

Federal statistics show that the average annual expenditure for food, clothing and fuel by a family of five persons is $446. Of this $9.90 represents freight paid for transporting the various materials from the producing points. An increase of 10 per cent in freight rates would add 99 cents a year, less than one-third of a cent per day, to the living expenses of this family of five persons.

An increase of 10 per cent in freight rates would amount to an extra charge of one cent on any of the following shipments.

22 1-5 lbs. dressed beef, Chicago to New York.
33 1-3 lbs. ham or bacon, Chicago to New York.
33 1-3 lbs. lard, Chicago to New York.
55 lbs. canned fish, Boston to St. Louis.
6 2-3 doz. eggs, Iowa to New York.
12 1-2 qts. milk, northern New York to New York.
8 qts. cream, northern New York to New York.
33 1-3 lbs. sugar, New York to St. Louis.
33 1-3 lbs. coffee, New York to St. Louis.

11 1-3 lbs. tea, New York to St. Louis.

55 1-2 lbs. breakfast food, Battle Creek to New York.

3 gals. whiskey, Peoria to New York.

40 lbs. flour, Minneapolis to New York.

11 suits clothes, Boston to New York.

2 suits clothes, Boston to St. Louis.

2 suits ladies' clothes, Boston to Chicago or St. Louis.

13 1-3 pairs gloves, Gloversville to New York.

83 1-3 yards woolen cloth, Boston to New York.

18 yards woolen cloth, Boston to Chicago.

15 yards woolen cloth, Boston to St. Louis.

20 pairs shoes, Boston to New York.

CHAPTER VI.

CLASSIFICATION OF TRAFFIC.

All carriers, water lines as well as railways, classify the freights they handle in transit as much as possible, although the water lines are not so particular in this respect as the rail lines. This classification is made on the bulk and value of the articles to be transported. All freight charges are supposed to be based on the actual weight of the goods carried, but there are instances in which strict adherence to one set scale of a certain charge per 100 pounds would be manifestly unfair. In most cases it would affect the carriers injuriously by not giving them reasonable pay for the service they perform; in other cases the shippers would suffer by being compelled to pay more than a fair charge for the carriage of their goods.

Why Classification is Made.

The expense of hauling a freight car is a known, definite quantity. So is the capacity of a car—the average car has a capacity of about 40,000 pounds of grain, say 666 bushels of wheat. There are many commodities, like certain forms of unfinished furniture, for instance, that would fill up the entire space of the car and yet not weigh much, if anything, over one-half what the wheat does. If the freight rate were fixed on an unyielding scale at so much per 100 pounds, the shipper of the wheat would be compelled to pay for the trans-

portation of his carload just double what the furniture shipper did, and yet the margin of profit to the producer on the latter would be much the greatest.

How Discrimination is Avoided.

If the set schedule of charges per 100 pounds were so arranged as to make a fair rate for the transportation of the carload of furniture, then the shipper of the wheat could justly claim that he was being discriminated against in the matter of rates. If, on the other hand, the charges should be based on the wheat solely and made to apply to all other traffic regardless of weight, bulk or value, the railway would find itself hauling many cars 1,000 miles for one-half what it charged for hauling other cars for the same distance. Here again we would have discrimination in another form. It was to do away with this possibility of discrimination, to equalize rates and make them fair to all shippers, that the classification system was adopted.

The most radical of railway advocates do not claim that the classification system is perfect; the existence of errors and imperfections is admitted, but these are gradually being weeded out.

Proper Classification a Hard Problem.

The construction of a classification list that will be fair to all concerned is one of the hardest problems in railroading. In a way, this classification is made on the basis of "what the traffic will stand," and yet this is not a fair way to describe it. A transportation company in making a schedule of rates would consider:

1. The competition of other roads.
2. The total volume of business.
3. The direction—that is, of loaded trains or empty trains.
4. The value of the article.
5. The bulk and weight.
6. The risk of transportation.
7. The facilities for loading and unloading.
8. The special equipment, if any, necessary.

Locality a Ruling Factor.

Locality is an important factor in classification, the idea being to encourage and develop traffic in some particular product incident to a certain territory. There are now three general and distinct freight classifications, known as the "Official," the "Southern" and the "Western," each constructed with a view to building up business in the territory to which it applies. The "Official" covers traffic from Chicago east and northeast; the "Southern" covers the entire South, and the "Western" all the field west and northwest of Chicago.

Division of Freight Into Classes.

As a rule, each classification schedule is divided into six classes, known as first, second, third, fourth, fifth and sixth. A commodity rated as first class in one of the three schedules may be second or even third class in the others; it is entirely a matter of local importance. Thus grain is the all-controlling factor in Western classification, while in the South cotton is the chief commodity. In both instances the rate is fixed by special commodity tariffs.

The Matter of Extra Rates.

Rates are based on classification, those on first-class freight being the highest and those on sixth class the lowest. In addition to the rates on classification there is often a penalty in the way of extra charge. Manure and fertilizer spreaders, when set up ready for use, are rated as 1½. This means that the charge for transportation is one and one-half times the first-class rate. This is because a set-up spreader is very bulky in proportion to its weight, and if charged for at the first-class rate only, would not give the company a fair return for transportation.

The same spreaders, "knocked down," are carried at third-class rates because more weight can be loaded into the same car space. The difference between first and third-class rates is about 33 1/3 per cent.

Illustration of the System.

Under the arrangement 100 spreaders, "knocked down," could be shipped a certain distance for say $10. The freight charges on 100 spreaders set up and carried the same distance would be fully $22.50. Why? Simply because the set-up spreaders, while weighing no more than those "knocked down," would occupy a great deal more car space. Under this latter condition the transportation company would get no pay for the use of a lot of car space which, under the present classification system, is utilized to advantage.

Rates on Carload Lots.

All classification rates are, of course, based on carload lots. In the matter of determining what a carload

is, the matter of weight rules. For certain kinds of goods there is a minimum of 12,000 pounds. For others the minimum runs up to 40,000. The general average is 24,000. Minimum weight means that in order to secure carload rates charges must be paid on the minimum named, regardless of any shortage in weight.

It is thus made impossible for a shipper to get carload rates on a basis of 24,000 pounds to a car, load only 20,000 pounds and pay charges on the actual weight of the shipment. If he obtains a carload rate he must pay on the minimum weight capacity of that car despite the fact that he does not use it.

Rates Fixed by Classification.

The recent prevailing rates in the Official Classification of freights between New York and Chicago, per 100 pounds, were as follows:

First class, 75 cents.
Second class, 65 cents.
Third class, 50 cents.
Fourth class, 35 cents.
Fifth class, 30 cents.
Sixth class, 25 cents.

Exceptions are made in classification rates where the bulk of traffic warrants this course. Wheat, for instance, is in class 4. Instead of charging the full class rate of 35 cents per 100 pounds, however, the lines make a special rate of 16 cents, or less than one-half. Corn and other cereals are handled in the same way. When

the grain is intended for export, the rate is still further reduced to 13 cents.

How Classification is Fixed.

In making up a classification, as already explained, the transportation men keep in mind three vital points, viz.: Weight, bulk and value. In this connection must also be considered ease in handling, risk of loss or damage in transit, etc. It would be impossible to give a classification list in detail owing to the volume of space required, but a fair idea may be had from the following items, the rate of transportation per 100 pounds by the carload being for the haul between Chicago and New York.

Article.	Class.	Carload.	Rate.
Cotton	1	36,000	75c
Corn huskers	2	24,000	65c
Harrows K. D.	3	24,000	50c
Harvester wire	4	24,000	35c
Metal bedsteads	5	30,000	30c

Subdivisions in Classification.

All the important items of freight traffic are subdivided into numerous classes, each taking a different classification and consequently a different rate, and frequently varying greatly as to the minimum weight per carload. The item of glass furnishes a good illustration of this subdivision.

Article.	Class.	Weight.
Leaded—boxed	3 to 1	24,000 lbs.
Plate—boxed	1	24,000 lbs.
Rough—N. O. S.*	4	36,000 lbs.
Window—boxed	1	36,000 lbs.

*Not otherwise specified.

This same subdivision occurs, to greater or lesser extent, in nearly every item in which there is any considerable amount of traffic. In the handling of furniture there are 290 separate and distinct subdivisions. Many of the articles enumerated are rated in the same class, but they are treated separately.

Decision of Minimum Capacity.

All calculations as to the minimum weight capacity are based upon the standard car of 36-foot length. Three per cent of this capacity is added for each additional foot of length, and 3 per cent subtracted for each foot of shortage. Fractions of six inches or less are not taken into consideration. All calculations are made on the inside measurement of the cars. The minimum load must not be under 91 per cent of the full capacity.

The exact weight of carload capacity depends upon the nature of the freight. All modern 36-foot cars are constructed to carry a maximum load of 30,000 pounds. The minimum load of such a car on a 91-per cent basis would be 27,300 pounds.

What Classification Does.

There are many goods, however, a full carload of which would not weigh 27,000 pounds, or anything like it. A carload of some materials will not run over 8,000 pounds, and if there was no grading of freights a railway would be hauling cars with the earning capacity of each differing widely. One carload of 30,000 pounds, at 35 cents per 100 pounds, would bring the road $105, while another, travelling the same distance,

but carrying only 8,000 pounds, would earn considerably less than one-third of $105. It was to abolish this inequality that the classification system was adopted.

Such trouble or discontent as may exist is not due to the classification system, but to misuse of it. Many shippers claim, and justly, that they are compelled to pay exorbitant charges by reason of the wrong classification of their products, but this is a matter which is gradually being corrected.

CHAPTER VII.

UNIFORM BILL OF LADING.

For many years, in fact from the inception of railroading in 1830, right up to 1904, there was much dispute between rail carriers and shippers as to the terms upon which freight would be received and transported. Each road had its own bill of lading, and very few of them were alike.

These bills of lading, as a rule, were ambiguously worded with the purpose of minimizing the liability of the carriers and throwing responsibility for safe carriage, as much as possible, on the shipper. This ambiguity gave rise for grave doubt as to the actual meaning of some of the important clauses, and expensive actions at law were common.

First of the Uniform Bill.

By 1904 discontent had become so widespread and assumed such organized form among shippers, that the railroads were forced to yield to the demand for one uniform, clearly worded bill of lading, which would be fair to shipper and carrier alike, and as to the meaning of which there could be no reasonable doubt.

Through the instrumentality of the Interstate Commerce Commission, and by agreement between carriers, shippers and bankers,—these latter being interested because they cash drafts with bills of lading attached—

adoption of a satisfactory uniform bill was first made in Official classification territory. Since then it has been generally adopted.

Great Advantage to Shipper.

The advantage in this change to the shipper is greater than to anyone else. Under the old arrangement, the conditions governing the handling of shipments were different, in the Central Freight Association territory, from those current in the Eastern Association. These again differed from those of the New England Association, and they were all different from the association of rate lines. A shipment going any distance traversed more than the confines of any one of these associations, and it became a general custom to use a receipt stamped or printed with the information that the initial carrier received the shipment subject to the conditions of its own bill of lading only.

Trouble With Old Form.

These conditions in turn provided that the initial carrrier was responsible for loss only while the shipment was in its possession, and that it was authorized by the shipper to turn over the shipment to connecting lines, subject to conditions of that line's bill of lading. When anything happened to the shipment through being lost, destroyed, or damaged in any way, it made it necessary to refer to the contract under which it was being carried. There was great trouble in store for the shipper; first to find out how and where the loss or damage occurred; in whose hands the responsibility lay;

and just what the conditions were that governed the responsibility.

Removes Opportunities for Delay.

Opportunities for delay on the part of the carrier in adjusting were multiplied by these complications, and the outcome of suits, brought to enforce payment of claim, were made doubtful in the extreme. Such was the condition that stirred the various associations of commerce and manufacturers' associations to keep the agitation up until their action was successful in getting the uniform bill absolutely required in the Official classification territory, where the shippers are strongest, financially and numerically.

In order to insure uniformity, the Interstate Commerce Commission has authorized railroads to make an increase of 10 per cent in carriage charges on shipments presented on forms other than the uniform.

Forms in General Use.

The straight forms which all railroads now issue to customers are the straight uniform bill of lading, exactly as used in the Official classification territory. The dispensing of rate tickets, freight receipts, etc., was a long step in advance itself. The use of a uniform bill of lading gives the shipper a bill of lading for absolutely every shipment he makes, and a specification or complete contract setting forth all the conditions that surround the responsibility for that shipment from the time it starts until it arrives at its destination.

It was difficult at first to get the roads to consent

to the use of this form, but now that its advantages have been shown it is doubtful whether any of them would willingly consent to its abandonment.

Features of Uniform Bill.

There is now no room for dispute as to whether a certain bill of lading was issued for a particular shipment. Under the new order a bill of lading is always issued for every shipment, the idea being that the original shall be retained by the shipper, and a copy, which is a complete transcript of the contract under which the shipment is made, sent to the consignee as his memorandum and record. Every shipper has experienced difficulty in the settlement of claims, because of his inability to present a bill of lading to the claim agent. In the attempt to secure one, much time is wasted, and the shipper often learns that all he gets is a copy of the shipping receipt, so that he must begin over again for a second time to secure a bill of lading, all of which is annoying. This is now obviated by the uniform bill of lading.

Advantages in Banking Deals.

The new bills are of the utmost importance to bankers who loan millions of dollars annually on shipment of fruit of all kinds, grain, cotton, etc., while on the way to market. In many cases the shipper draws against the shipment, and the new form gives the banker assurance that he has good security for his money without employing an expert to scan and interpret the different forms of bills of lading, as there is only one form, and the banker has a copy of that.

Uniform Bill of Lading—Standard form of Straight Bill of Lading approved by the Interstate Commerce Commission by Order No. 787 of June 27, 1908.

Railroad Company.

Shippers No.

STRAIGHT BILL OF LADING—ORIGINAL—NOT NEGOTIABLE.

Agents No.

RECEIVED, subject to the classifications and tariffs in effect on the date of issue of this Original Bill of Lading,

at 19

from the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated below, which said Company agrees to carry to its usual place of delivery at said destination, if on its road, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions, whether printed or written, herein contained including conditions on back hereof) and which are agreed to by the shipper and accepted for himself and his assigns.

The Rate of Freight from

to is in Cents per 100 Lbs.

If Special per

If ...times 1st	If 1st Class	If 2d Class	If 3d Class	If 4th Class	If 5th Class	If Class A	If Class B	If Class C	If Class D	If Class E

(Mail Address—Not for purposes of Delivery.)

Consigned to

Destination, State of County of

Route, Car Initial Car No.

No. Packages	Description of Articles and Special Marks.	Weight (Subject to Correction)	Class or Rate	Check Column

THIS FORM TO BE PRINTED ON "WHITE" PAPER.

If charges are to be prepaid, write or stamp here, "To be Prepaid."

Received $ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per

(The signature here acknowledges only the amount prepaid.)

Charges Advanced:

$

Shipper. Agent.

Per Per

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

Uniform Bill of Lading Now in General Use by All the Railroads.

Conditions of Uniform Bill.

The terms of the contract thus made between shipper and carrier are printed in detail on the back of each bill, so that everybody, shipper, consignee, or banker, who has a copy of the bill of lading for any particular lot of freight, knows the exact condition under which shipment was made. These conditions are as follows:

Sec. 1. The carrier or party in possession of any of the property herein described shall be liable for any loss thereof or damage thereto, except as hereinafter provided.

No carrier or party in possession of any of the property herein described shall be liable for any loss thereof or damage thereto or delay caused by the act of God, the public enemy, quarantine, the authority of law, or the act or default of the shipper or owner, or for differences in the weights of grain, seed, or other commodities caused by natural shrinkage or discrepancies in elevator weights. For loss, damage, or delay caused by fire occurring after forty-eight hours (exclusive of legal holidays) after notice of the arrival of the property at destination or at port of export (if intended for export) has been duly sent or given, the carrier's liability shall be that of warehouseman only. Except in case of negligence of the carrier or party in possession (and the burden to prove freedom from such negligence shall be on the carrier or party in possession), the carrier or party in possession shall not be liable for loss, damage, or delay occurring while the property is stopped and held in transit upon request of the shipper, owner, or party entitled to make such request; or resulting from a defect or vice in the property or from riots or strikes. When in accordance with general custom, on account of the nature of the property, or when at the request of the shipper the property is transported in open cars, the carrier or party in possession (except in case of loss or damage by fire, in which case the liability shall be the same as though the property had been carried in closed cars) shall be liable only for negligence, and the burden to prove freedom from such negligence shall be on the carrier or party in possession.

Limits to Carrier's Liability.

Sec. 2. In issuing this bill of lading this company agrees to transport only over its own line, and except as otherwise provided by law acts only as agent with respect to the portion of the route beyond its own line.

No carrier shall be liable for loss, damage or injury not occurring on its own road or its portion of the through route, nor after said property has been delivered to the next carrier, except as such liability is or may be imposed by law, but nothing contained in this bill of lading shall be deemed to exempt the initial carrier from any such liability so imposed.

Sec. 3. No carrier is bound to transport said property by any particular train or vessel, or in time for any particular market or otherwise than with reasonable dispatch, unless by specific agreement indorsed hereon. Every carrier shall have the right in case of physical necessity to forward

said property by any railroad or route between the point of shipment and the point of destination; but if such diversion shall be from a rail to a water route the liability of the carrier shall be the same as though the entire carriage were by rail.

The amount of any loss or damage for which any carrier is liable shall be computed on the basis of the value of the property (being the bona-fide invoice price, if any, to the consignee; including the freight charges, if prepaid) at the place and time of shipment under this bill of lading, unless a lower value has been represented in writing by the shipper or has been agreed upon or is determined by the classification or tariffs upon which the rate is based, in any of which events such lower value shall be the maximum amount to govern such computation, whether or not such loss or damage occurs from negligence.

Claims for loss, damage, or delay must be made in writing to the carrier at the point of delivery or at the point of origin within four months after delivery of the property, or in case of failure to make delivery, then within four months after a reasonable time for delivery has elapsed. Unless claims are so made the carrier shall not be liable.

Any carrier or party liable on account of loss of or damage to any of said property shall have the full benefit of any insurance that may have been effected upon or on account of said property, so far as this shall not avoid the policies or contracts of insurance.

Necessary Repairs and Shipper's Risk.

Sec. 4. All property shall be subject to necessary cooperage and baling at owner's cost. Each carrier over whose route cotton is to be transported hereunder shall have the privilege, at its own cost and risk, of compressing the same for greater convenience in handling or forwarding, and shall not be held responsible for deviation or unavoidable delays in procuring such compression. Grain in bulk consigned to a point where there is a railroad, public, or licensed elevator, may (unless otherwise expressly noted herein, and then if it is not promptly unloaded) be there delivered and placed with other grain of the same kind and grade without respect to ownership, and if so delivered shall be subject to a lien for elevator charges in addition to all other charges hereunder.

Charges for Storage and Detention.

Sec. 5. Property not removed by the party entitled to receive it within forty-eight hours (exclusive of legal holidays) after notice of its arrival has been duly sent or given, may be kept in car, depot, or place of delivery of the carrier, or warehouse, subject to a reasonable charge for storage and to carrier's responsibility as warehouseman only, or may be, at the option of the carrier, removed to and stored in a public or licensed warehouse at the cost of the owner and there held at the owner's risk and without liability on the part of the carrier, and subject to a lien for all freight and other lawful charges, including a reasonable charge for storage.

The carrier may make a reasonable charge for the detention of any vessel or car, or for the use of tracks after the car has been held forty-eight hours (exclusive of legal holidays), for loading or unloading, and may add such charge to all other charges hereunder and hold such property subject to a lien therefor. Nothing in this section shall be construed as lessening the time allowed by law or as setting aside any local rule affecting car service or storage.

Property destined to or taken from a station, wharf, or landing at which there is no regularly appointed agent shall be entirely at risk of owner after unloaded from cars or vessels or until loaded into cars or vessels, and when received from or delivered on private or other sidings, wharves or landings shall be at owner's risk until the cars are attached to and after they are detached from trains.

Articles of Extraordinary Value.

Sec. 6. No carrier will carry or be liable in any way for any documents, specie, or for any articles of extraordinary value not specifically rated in the published classification or tariffs, unless a special agreement to do so and a stipulated value of the articles are indorsed hereon.

Sec. 7. Every party, whether principal or agent, shipping explosive or dangerous goods, without previous full written disclosure to the carrier of their nature, shall be liable for all loss or damage caused thereby, and such goods may be warehoused at owner's risk and expense or destroyed without compensation.

Sec. 8. The owner or consignee shall pay the freight and all other lawful charges accruing on said property, and, if required, shall pay the same before delivery. If upon inspection it is ascertained that the articles shipped are not those described in this bill of lading, the freight charges must be paid upon the articles actually shipped.

Diversion to Water Route.

Sec. 9. Except in case of diversion from rail to water route, which is provided for in section 3 hereof, if all or any part of said property is carried by water over any part of said route, such water carriage shall be performed subject to the liabilities, limitations and exemptions provided by statute and to the conditions contained in this bill of lading not inconsistent with such statutes or this section, and subject also to the condition that no carrier or party in possession shall be liable for any loss or damage resulting from the perils of the lakes, sea, or other waters; or from explosion, bursting of boilers, breakage of shafts, or any latent defect in hull, machinery, or appurtenances; or from collision, stranding, or other accidents of navigation, or from prolongation of the voyage. And any vessel carrying any or all of the property herein described shall have the liberty to call at intermediate ports, to tow and be towed, and assist vessels in distress, and to deviate for the purpose of saving life or property.

The term "water carriage" in this section shall not be construed as including lighterage across rivers or in lake or other harbors, and the liability for such lighterage shall be governed by the other sections of this instrument.

Sec. 10. Any alteration, addition or erasure in this bill of lading which shall be made without an indorsement thereof hereon, signed by the agent of the carrier issuing this bill of lading, shall be without effect, and this bill of lading shall be enforceable according to its original tenor.

Enables Shippers to Get Money.

Suppose a Chicago shipper has started a lot of grain for New York and does not want to wait for his money

until the grain reaches New York, is sold, and the draft in payment is mailed back to Chicago. In the ordinary course of business this would mean a lapse of nearly two weeks or more. The uniform bill of lading makes possible a much more expeditious process. It is even possible for a shipper to get his money for a shipment on the day it is loaded.

Armed with a bill of lading showing the grain is actually in the custody of the railroad, the shipper makes a draft on the consignee in New York for the marked value of the shipment. He attaches this draft to the bill of lading and presents it at his bank, which honors his check against the collateral thus deposited.

Bankers Disliked Old Method.

While it was possible to do business of this kind under the old system, bankers, as a rule, did not favor is because of the lack of uniformity in the various bills of lading, and the wide difference in the conditions under which they were issued. Where financial accommodation was extended in this manner, it was more on account of the financial standing and responsibility of the people concerned, than on the actual security of the bill of lading.

Where merchandise or grain was shipped over a route composed of two or three different roads with conflicting bill of lading conditions there was too much doubt and uncertainty as to responsibility in case of loss to make the cashing of drafts on this kind of collateral inviting.

How Bankers are Secured.

When a transaction of this nature is made under the new system the bill of lading is of what is known as the "order" form. Allow that a shipment of grain has been forwarded to the firm of John Peters & Co., New York, a draft against which is to be cashed by the First National Bank of Chicago. The order bill of lading will show that the grain is consigned to the order of the First National Bank, and that the railroad is to notify John Peters & Co. of its arrival in New York. On receipt of this notice Peters & Co. make arrangements with the New York correspondent of the First National Bank to take up the draft. When this is done the bill of lading, properly endorsed, is turned over to Peters & Co., who present it to the railroad company and receive the grain.

This gives the bank protection because, until Peters & Co. have paid the draft, the bank holds possession of the bill of lading, without the delivery of which the railroad will not surrender the grain.

Milled-in-Transit Bills.

Another form of the uniform bill of lading—the general conditions are the same in all—is the milled-in-transit bill. To illustrate its operation let us take the following purely suppositious instance:

The through rate on grain from Hastings, Neb., to Chicago is 35 cents per 100 pounds. The local rate from Hastings to Omaha, plus the rate from Omaha to Chicago, is considerably more than the through rate. M owns a mill at Omaha. He has bought a lot of wheat

at Hastings, which he is under contract to deliver in Chicago as flour. Instead of paying the local rate on the wheat from Hastings to Omaha, and making a new shipment of the flour to Chicago, he ships the wheat from Hastings through to Chicago on a "milled-in-transit" bill of lading.

Benefit to the Miller.

Under the special terms of this form M, while obtaining the benefit of the Hastings-Chicago rate, has the privilege of stopping his wheat at Omaha, grinding it, and then reshipping it to Chicago. If it were not for this privilege of milling in transit M would have to pay some miller in Chicago for grinding the wheat while his own mill stood idle.

The effect of this milled-in-transit privilege has been to build up milling interests along the lines of railway away from the large centers like Minneapolis. If it were not for this milled-in-transit privilege it would be impossible for any of the smaller mills to do anything but a purely local business.

Necessity for Bill of Lading.

In ordinary mercantile business, the bill of lading represents the culmination of a sale—the receipt for goods shipped, and is naturally an important document. It would be just as reasonable for a merchant to give out money without taking a receipt as to make shipment of goods without a bill of lading. A simple receipt would not, however, be entirely satisfactory, as it would not show the conditions under which the shipment was made,

the liability assumed by the carrier beyond that imposed by common, State or Federal law, nor the charges which might be assessed by the carrier for the service.

A bill of lading contains specific conditions showing to a scientific nicety the responsibility of the carrier, terms under which the shipment is accepted, and the rate that shall be charged, and gives in full all terms, requirements or stipulations. In brief, the bill of lading is a contract between the shipper and the carrier.

CHAPTER VIII.

PRIVATE CARS AND FAST FREIGHTS.

Many large shippers, especially those in the slaughtering and packing business, find it a convenience to own their own cars. In the prompt handling of fresh meats and similar products this private car system has become a virtual necessity. It does away with doubt as to obtaining a supply of cars when needed, and renders the shipper independent of the railroad in this respect. It also minimizes the opportunity for a railroad to handicap certain shippers by withholding cars on the plea of shortage, while at the same time favoring others by furnishing them with all the cars needed. Before the introduction of the private car system, there were many abuses of this nature, and it was possible to destroy, or greatly injure, the business of any shipper toward whom a railroad might conceive a dislike.

Rates on Private Car Shipments.

Owners of private cars are supposed to pay the same rates as shippers who use the ordinary railway cars, but, as recompense for the use of their own cars, these owners are allowed a mileage rebate. In the East, the railways allow three-quarters of a cent per mile for the use of a private refrigerator car. In the West the allowance is one cent a mile. On a trip from Chicago to New York the owner of a private car would thus have an advantage of $7.50 in freight charges over a

shipper using the ordinary railway car. Against this saving of $7.50 the car owner must figure the interest on his investment, etc.

The system has its favorable and unfavorable features, both as regards carriers and shippers. The strongest protest made against it is that it tends to give a larger shipper with ample capital an undue advantage over his smaller competitor, who cannot afford to own his own cars. While it is true that the owners of private cars get their hauling done at a lower rate than the non-owner can obtain, it is doubtful whether this saving much more than offsets the cost of the investment. The great real economy would seem to be in the increased efficiency of service.

Of Benefit to Railroads.

Under the old system, when railroads had to furnish all the cars required in the service, investment of an enormously large amount of money in car equipment was necessary. This has been materially lessened by the use of private cars. Not that the roads are spending less for cars than formerly—they are spending far more. But, they are not buying anything like the number of cars they would have to if so many of the large shippers did not own private cars.

How large an item this is may be readily estimated from the fact that in Chicago alone there are eight large packing establishments which own their own cars, and send them out in trainloads daily. The same conditions prevail in other large cities like New York, Boston, Philadelphia, Cincinnati, Cleveland, Minneapolis, Kansas City, St. Louis, Denver and San Francisco.

Railway statisticians place the total number of private cars in the United States at close to 200,000, which is about 7 per cent of the total engaged in American railway traffic.

Evil of Car Detention.

The larger the number of private cars in use on a given line of railway the less will that road suffer from car detention by other lines. This matter of car detention is one of the most serious problems railway men have had to contend with. Under the old system, the Erie would send out a car from New York, bound for some point in Ohio. Here it might be impressed into service by an Ohio road and sent to some Southern point, where in turn a Southern road would use it. By persistent "tracing" it might be in time located and recovered.

There is such a thing as cars dropping out of sight entirely and never being heard of again. There are other instances in which cars started from New York for Buffalo have been located at obscure stations in Montana.

New Per Diem Detention Rate.

Railroads which thus impress the cars of another road into use are supposed to pay one-sixth of a cent per mile for their use, but in many instances they don't do it. Missing cars have been found in service as storage houses, in which capacity they had served for months. The mileage traveled was comparatively small, so the amount to be collected at one-sixth of a

cent per mile was insignificant and did not begin to pay the owning railroad for the loss of car service.

This has led railroads to substitute a per diem, instead of a mileage charge, for detained cars. When a road delivers a car into the keeping of another road a fixed charge, generally of twenty cents a day, is made for every day the car is detained. There can be no evasion of this charge by the receiving road. It is responsible for it regardless of where the car may wander, and as a consequence it is to the interest of such roads to return all cars promptly.

This per diem charge has also put an effectual stop on the practice of some roads in allowing their patrons to retain the cars of other roads as storage places without charge. The roads must pay detention charges, and naturally they are going to get the cars back to their owners as soon as possible.

Private Cars Not Detained.

Private cars are not subject to detention in this way. The sign of ownership painted on the sides is too prominent. Ordinary railway cars are also thus labeled, but to see a car bearing the ownership sign of the Pennsylvania road standing at a way station on a far Western line would occasion no comment, as interchange of cars is an unavoidable incident of railroading.

The sight of a car bearing the business sign of Armour & Co., in use at some out-of-the-way place, where the firm has no connection, would soon set every tongue in the neighborhood to wagging. Besides this, there would be no chance for diversion of this sort except by

outright theft, as the comity of interchange of car service between railroads does not extend to private cars.

One Source of Abuse.

There is one grave danger in the private ownership of cars. It is possible to so manipulate the mileage records as to give the owner of these cars a much lower freight rate, aside from his lawful car mileage, than can be obtained by competitors who use the ordinary cars. If numerous complaints are well founded, discrimination of this kind is not uncommon.

The man who owns a private car is entitled to a mileage rebate for its use. He saves the railroad the use of one of its own cars, thus releasing it for other service. It is therefore no more than right that he should be paid for the use of his own car. But the rate of payment must be equitable; so arranged that, when due allowance is made for the investment, the actual charge for freight haulage shall be the same to car owner and non-car owner. Whether this is accomplished by the present Eastern allowance of three-quarters of a cent per mile is problematical.

The One Great Advantage.

Aside from the opportunity for favoritism in the matter of freight rates, private ownership of cars has one all-important advantage—it enables a shipper to move his product with certainty. The big packer, with 100 carloads of perishable beef to move, is no longer at the mercy of the freight agent of the P. X. & Z. Railroad, who may feel inclined to say: "Sorry, Mr. Packer, but it is an absolute impossibility to give you 100 cars. I

might be able to squeeze out 10, but even this is doubtful."

Mr. Packer now ices and loads his own cars, delivers them to the P. X. & Z. road, and the latter has nothing to do except furnish the motive power. There is a time schedule for such trains and they move with the regularity, if not the speed, of the best express trains. There is no stopping at way stations to load or unload freight. No stops of any kind, except for fuel and water and to change engines. Under these conditions it is not uncommon for a train to make the run from Chicago to New York in forty hours, or less.

Origin of the Private Car.

Private car ownership grew out of the fast freight service. In the early days of railroading, private cars and special trains were unknown. Even when the transportation business had grown to such proportions that a shipper occasionally loaded one or more cars with his own product such a thing as making special runs with these cars were unheard of. They were hauled on the ordinary trains, subject to all the delays of way traffic.

It was then the practice to load cars promiscuously, without regard to the saving of time en route. One car might contain shipments for a dozen or more stations, and a stop would have to be made at each for unloading, as well as loading, purposes. All freight trains were moved on practically the same schedule, and it was not a very fast one.

Finally some genius conceived the idea of sorting the freight, loading it into cars according to destination and, when this destination was reached, dropping the car

there instead of holding the entire train while the freight for that station was sorted out.

First of Fast Freight Lines.

This was the beginning of the fast freight service. Companies like the Empire, the Merchants' Despatch, and numerous others, were organized. These companies bought their own cars, arranged with the railroads for fast trains, and were thus able to offer shippers of first-class freight advantages in the way of time-saving, etc., which could not be obtained in the ordinary freight service. The fast freight lines made a good profit by the increased charge which their fast trains warranted, and this profit was increased by the rebate mileage which the railroads allowed for the use of the cars.

This fast freight service was popular with the shippers from the start. The saving of time was an important item, and in many instances more than counterbalanced the increased charge for transportation. Where several New York shippers had a lot of merchandise for Cleveland it would be loaded into one car and sent through without being held up at the intermediate way stations.

Victory of Private Car Men.

The plan worked so well that the big shippers, men who send out produce by the trainload, became interested, and those who had the business to warrant it and the capital to operate with, began to use their own cars. There was serious objection to this at first. In many instances, the fast freight lines were nothing less than auxiliaries to the railroads, their financial interests being

largely identical. For a time, the railroads, because of their interest in the fast freight lines, were not willing to give the private car owners equal privileges as to mileage rebates and train service, and a merry war resulted. It ended in the complete surrender of the railroads, the courts holding that, as common carriers, they could not be permitted to discriminate between patrons who tendered exactly the same class of business.

Fast Freight Lines Increasing.

Despite the large number of cars now owned by shippers the fast freight lines are more numerous and offer a more extended service than ever. While the number of privately owned cars is large, the number of shipper-owners is comparatively small. On the other hand, the number of people who are unable to own their own cars, but who desire a similar service, is increasing every year, and it is to these that the fast freight lines cater. There is business enough for all.

CHAPTER IX.

SOME TRANSPORTATION PROBLEMS.

Next to agriculture, the transportation business of this country is first in importance. It has been estimated that over one-fifth of the wealth of the United States is invested in railroads. In 1915 they employed directly over 1,848,000 men, and for services alone paid out $2,915,000,000 annually, while the total annual disbursements amounted to nearly twice as much; and yet ninety years ago the locomotive was unknown, and nowhere in the world did a railroad exist.

In 1832 there were only 299 miles of railroad in the United States, while today there are over 377,000 miles of track. It is said a man will carry 66 pounds twelve miles per day over bad roads; a horse will carry 440 pounds; a locomotive will haul 350,000 pounds a greater distance in an hour at a cost of, say, half one cent per ton per mile. One may readily see the strides made in transportation, and almost measure the progress of civilization by it.

Rates Should be Stable.

The United States, with only one-twelfth the world's population, has fully one-half of all the railway mileage of the globe. One can ship freight and personally travel farther for less money, receive better service, and enjoy more comfort than the people of any other section of

the earth. This is one of the dominant causes of our success commercially.

The average rate of freight charged in the United States in 1870—about fifty years ago—was nearly three times as much as is charged today, or conversely, the average rate per ton per mile now in existence is only a trifle over one-third of what was paid in 1870. American railroad rates generally are more than one-third lower than those in Great Britain. Wise railway men hold that railroad rates should be unfluctuating, and without preference as between individuals and communities.

Pooling and Anti-Pooling.

From the beginning of railroads until about 1870 there were very few laws, either State or National, for their regulation. About 1872 an agitation began which has generally been referred to as "The Granger Movement," and all kinds of railroad legislation was advocated. There seems to have been a delirium for regulation of passenger and freight rates by statute epidemic at that time. The first National law, however, that was considered, was known as the Reagan bill, and from this sprang the present law known as the Interstate Commerce Act, which was designed to prevent unjust discriminations in rates; but in the discussion of that measure the feeling against trusts and combinations of all kinds was introduced, and pooling was prohibited, which has resulted in a continuation of preferential rates—mostly of a secret nature—all of which are a menace to justice and fair play, and ought to be obliterated. At the time of the discussion of the

merits of the Reagan bill, Judge Reagan, the originator and introducer of the bill, was against pooling, but after having been chairman of the Texas Railroad Commissioners for over ten years, he has changed his mind and now favors such legalized pooling.

Effects of Keen Competition.

The competition between large carriers is so intensely energetic that it seems impossible to secure a maintenance of rates without an apportionment of the business. The longer the line and the poorer its service between any two competitive points, the more inducements it is tempted or obliged to offer to get a share of the traffic; and the more business it is allowed by the stronger or shorter lines to take, the greater the share it is educated in believing itself entitled to; so that it becomes an absolute necessity for the strong lines to recognize the competition of the weaker ones.

Large shippers thoroughly appreciate this and are quick to take advantage of it. It is quite remarkable, under existing conditions, that rates have been as well maintained as they have been. The old saying that "competition is the life of trade" does not seem to hold good in the present age. Carried to its logical conclusion, unrestricted competition is the death of trade—so far as railroads are concerned.

Benefits of Combination System.

There have already been tremendous strides made in combining railways. The Atchison, Topeka & Santa Fe Railway system is composed of over one hundred smaller corporations. Rates are now lower, service is

better, and wages are higher than before the consolidations took place. The people expect more from large corporations than from small ones, and they are usually managed more intelligently and are more apt to respond to public opinion. The very fact that they represent so much capital makes them anxious to maintain the good will of the community.

Three Possible Relief Plans.

The best-disciplined and experienced commercial minds of the world are now engaged in trying to work out in all industrial pursuits a plan whereby, through combination, unrestricted competition will cease, labor and capital be protected, and the world generally be more intelligently and better provided for. One of three things in the railroad business is likely to happen:

1. The legalization of pooling, whereby the railroads may make enforceable contracts between themselves for a division of the business based on reasonable rates.

2. The unification of ownership, which, in the absence of the first proposition, is making rapid strides.

3. The taking over of the railroads by the government, to own and operate them, as is done in Germany and some other European countries.

Danger of Unbridled Discrimination.

There are many men like Paul Morton, formerly second vice president of the Santa Fe system, who advocate legalized pooling, because they believe it will go a long way toward insuring a maintenance of tariffs, and thereby prevent favoritism and inside rates

to large shippers and great cities. These men assert that the very foundation of the State itself is threatened by any long-continued discrimination against the small shipper and the small town. We want prosperous villages and towns all over the United States, and in time we will insist that the freight rates of the country shall be as unfluctuating between individuals and communities as the price of postage stamps.

To Preserve Reasonable Rates.

These men can see no good reason why Congress should not legalize pooling, so long as rates are reasonable. Rates can become unreasonable, and there is as much to fear from their being unreasonably low as from being unreasonably high. They can be so low as to be unremunerative, thereby in time impairing the property and destroying the service. They can be so high as to check the movement of business. The selfish interest of the carrier generally prevents this. There should be proper supervision to see that they are reasonable, which means neither too high nor too low for increasing and promoting commerce.

Unification of Railway Interests.

The absence of an arrangement similar to pooling is causing the unification of ownership of railroads. This is now frequently referred to as "the community of interests." Of this, Mr. Morton said: "Personally, I prefer it to pooling, and do not view the ownership of all the American railroads by a single community of interest with the slightest alarm. The benefits the public would receive from such a condition would be

much greater than any harm that could come from it. Unrestricted competition benefits a few, is disastrous to the many, and costs too much. There is a vast amount of money wasted every day by American railroads which ought to be saved; and if it could be saved, the railroads of the country would certainly give the shipping and traveling public a fair proportion of it, either in lower rates or an improved service."

Improved Service, Lower Rates.

Ever since railroads have been in operation rates have been getting lower and the service better. Eighty years ago the large proportion of the travel was by stage, at 25 cents per mile; no baggage was allowed except that carried by hand; passengers rode three in a seat with great discomfort, and made forty miles a day if roads were good. Now one may travel with the greatest of luxury, in Pullman cars and dining-cars, for about 2½ cents per mile, and make forty miles in an hour. In other words, the transportation of the country has advanced in speed from forty miles per day to forty miles per hour, and the cost is only one-tenth of what it used to be. And the comforts coined by American inventors and transportation men are easily more than sixteen to one in the circulation of commodities and persons with certainty, celerity and safety throughout this vast republic.

Objections to Government Ownership.

If all the railroads should be owned by one syndicate —it is probable this syndicate would be composed of the people generally—there will arrive a time when a

vehement demand will be made for government ownership and operation of the railroads of the United States. It will be phenomenally remarkable if such demand does not come. But it is doubtful if such popular importunity will result in the transfer of the railroads from individuals to the government, because it is manifestly demonstrable that private parties can more efficiently and cheaply operate the roads than can the government.

There are many things against the ownership and control of railroads by the government. The building up of a great political power would be a sufficient reason for opposing such an ownership and management, but the simple fact that the government seems unable to do anything efficiently and economically in the way of building or operating properties is a far better reason for confining the government to legitimate functions and keeping it out of all business, except its logical one of protecting the life, liberty, and property of its citizens.

Problems that Cause Worry.

The problems that a railroad traffic officer has daily to solve are so diversified and interesting that they are always fascinating. His every-day life is made up of all kinds of surprises. He has two groups of citizens always in view, one being his employers—the stockholders of the company he serves—and the other being his constituency, or the public which the railroad serves and to which he is obliged to cater.

He probably finds, from a perusal of his morning mail, that there has been a smash in copper or a labor

strike which may close up some mining district or shut down some industry; or that a bad frost has destroyed the fruit crop; or that hot winds have burned up the corn; or that a war declared between two foreign countries has caused a great demand for transport service, thereby taking out of regular channels such a large number of ships that ocean freights are all out of joint. All of these things may make it necessary to readjust rates in order to keep things moving. The traffic official who serves his constituency best, and thus promotes the prosperity of the people whom his company serves, serves best the company which employs him.

Need for Government Control.

There is legitimate need for the Interstate Commerce Commission, or some similar body of men appointed by the Federal government with power to supervise rates where there are pooling contracts in existence, and fair-minded railroad operators believe the law should be more comprehensive than it is now. All transportation by rail and water should be declared interstate commerce and subject to the supervision of such a commission. There is not sufficient State traffic by itself anywhere to justify excluding it, and it is irritating to see certain States taking action to protect the people within their own borders by nullifying orders that have been issued in the interest of the country generally by the national Interstate Commerce Commission. If we are to have a strong Federal commission, it is best to give it, if possible, full power over all traffic, both State and inter-State, and thus avoid confusion.

Limit on Railway Construction.

In England there is a good custom which makes it necessary to develop reasons for a railroad before it is allowed to be built. Railroads which are constructed for the sole purpose of selling out to lines already existing should not be tolerated. This is a matter that should be passed upon by the National commission, and no railroad should be chartered unless a necessity for it is clearly shown. Duplication and paralleling of railroads is a waste of money. The public finally has to bear the burden of all unnecessary railroads. A railroad may be likened to a street in a large city; it costs money to build a street and to keep it in order, and the citizens have to pay for it. Therefore, unnecessary streets, as a rule, are not constructed, and, in view of the control and regulation already partially assumed by the State and National governments, a similar protection to railroad investors and to the people themselves may be, and ought to be, demanded and accorded.

Railroading a Fascinating Profession.

The railroad business is a very fascinating occupation, and affords to young men as good a field of labor as any other avocation. It is not regarded as a profession, although without doubt it is just as much of a profession as either law or medicine, and within its boundaries are just as many opportunities for specialists as in either of the professions mentioned.

There is now, and always will be, a great demand for capable men, of good judgment; and every branch of the railroad business affords great opportunity to

young men. The best way for the young man who wants to acquire a knowledge of railroading, is to start on as small a road as possible, where he can get a knowledge of all departments. After acquiring more or less knowledge of the workings of the several departments, it will be easy for him to decide which particular department he prefers. Of course, a young man cannot always decide this matter for himself, and under such circumstances he should endeavor to master any work that is given him, with the well-defined idea that good men are scarce, and that there is always room at the top, which can only be reached by intelligence, industry, and integrity.

CHAPTER X.

RAILWAYS AS INDUSTRIAL FACTORS.

The year 1830 witnessed the first operation of railways, in the modern sense of the term, on a comprehensive scale for the carrying of passengers and freight. In this year the Liverpool & Manchester Railway, thirty-one miles long, was opened in the Old World, and the Baltimore & Ohio, from Baltimore to Ellicott's Mills, a distance of thirteen miles, was opened in the New. About ten years prior to this, namely, in the year 1819, the first steam vessel crossed the Atlantic; while in 1844 Professor Morse opened his telegraph line between Baltimore and Washington—the first practical telegraph system in the world. The steamship, the railway, and the telegraph are the gifts of the nineteenth century. They constitute elements new in the history of intercommunication.

Start of American Manufactures.

It may also be well to remember one other date, and that is the year 1840. About this time manufacturing in the wider sense of the term, began to take place in the United States. It is easy to trace the beginning of manufacturing in this country. It started, of course, in a very small way with the making of some of the immediate necessities, such as woolen goods. The ironworker commenced to make a few plows. Some one of our forefathers, who had learned the tanning busi-

ness in Europe, started to tan a few hides. The wheelwright went in partnership with the man who could make wagon bodies, and so a few woolen mills, plow factories, tanneries, and wagon factories had already made their appearance before 1830; but the bulk of the manufactured goods used in this country was sent over from Europe.

Railway Factor in Development.

By the year 1835 over a thousand miles of railway were in operation in the country, and at the close of 1915, 250,000 miles, in round numbers, were being operated in the United States. From 1830 to 1915 is 85 years, so that this development of railways is practically within the span of life.

That the railways have been factors in industrial development is a self-evident proposition. It goes without saying that there must be development where there are transportation facilities. Railways can remain passive and freight will, nevertheless, come to them, and more or less development will take place; but railways can also take an active part in development, and it is the policy of most of them to do so.

Education of a Foreigner.

Some years ago a foreign government railroad official visited this country for the purpose of investigating traffic matters on American railways. He said that the time had arrived when the railroads of his country, as the American railways had already done, would have to take cognizance of commercial conditions. His particular mission was to perfect plans to meet the com-

petition of a new route in an adjoining country. He was given information about tariffs, the system of interchanging freight-cars, and all that he inquired into. He became very much interested in the interest taken by American railways in development, and requested an outline in writing of what had been told him. In his country he said that if a man wanted, at his own expense, a side-track to a mine or to a manufacturing plant, months were taken up with red tape before giving a "yes" or "no" answer. About two years after his visit a statement was published in the official journal of his country, which practically amounted to an advertisement. It stated that if any capitalist contemplated starting a sawmill the chief government forester, on application, would detail a deputy, connected with the particular district, to show what timber tracts in the Crown forests were available.

How Railways Became Interested.

At first the mileage of railways in this country was very small, and they were merely competitors with teamsters. The first railways in the country were ventures connecting one town in the East with another. It meant something to build railways in those days. The public had little or no confidence in them, but gradually the idea became popular and railways began to extend in several directions. The men who directed the affairs of the roads unquestionably foresaw development, but the first thing in hand was to understand the working of the new business and the securing of immediate traffic. Soon came the project of running the rails to a coal field in order to bring fuel to the large

towns. Today this looks like a promising enterprise, but in judging of a past event one must see things as they appeared at the time in question. There was then an abundance of timber near all the larger towns, and cordwood was cheap.

Pushing the Rails Westward.

Nevertheless, the rails were laid to the coal mines, and still further extensions were made, so that by about 1850 the several lines of railway in operation between New York and Chicago formed an all-rail route. About 1856 lines were completed west to the Mississippi River. In 1867 the Missouri River at Omaha was reached, and in 1869 the railway was completed across the continent. But, though the railway spanned the continent, it must be remembered that between the Alleghenies and San Francisco there was, and is still, plenty of open space.

Work of Immigration Bureaus.

Building railways in Europe from one thickly settled district to another, with abundant capital awaiting investment, is one thing; building lines in a new country, extending them fifty miles beyond the last farm, and calling the terminus "end of track," is another. One of the first things that the railways, and more especially those west of Chicago, had to do, was to secure settlers on the lines. Hundreds of thousands of people now living in the great West are there because they or their fathers read the enticing pamphlets and leaflets published by the railway companies telling all about the new opportunities for farming. Great exertions

were made throughout the Eastern States to secure settlers for the West. Some railways even made efforts to secure farmers from the British Isles, Germany, and Scandinavia. The railways have now largely abandoned making efforts to secure settlers from Europe; in fact, the governments of Germany and Austria place obstacles in the way of disseminating emigration literature. Effects of the Great War remain to be seen.

Peopling the Western Country.

But the Western country is still sparsely populated, and the work of securing settlers from the more populous Eastern States has to go on. On some railways a regular immigration bureau is established, with an official in charge, usually called the "General Immigration Agent," who co-operates with land companies, land agents, and communities requiring more settlers. The growth of Chicago, the settlement and prosperity of the Western States, and the reflex of this western development on the prosperity of the East all attest the efficient labor performed by the railways in helping to get the country settled.

A Work of Self-Interest.

The railways do all this from motives of self-interest, but where a great enterprise is well directed the commonwealth is benefited. Millions of acres still await settlement, and this work must go on. The fact that it was ever undertaken on so extensive a scale by the railways will in course of time be forgotten, but the result is permanent. All this is intended to emphasize the fact that, in order to secure a general development

of industries, density of population is requisite. It does not mean that excessive density is required, but there must be a fair population. In this connection it may be noted in passing that history shows that anti-railroad legislation is generally identified with States that are sparsely populated.

Why Factories are Encouraged.

Agriculture is, of course, the basis of the country's wealth. The territory west of Chicago is now recognized as one of the principal granaries of the world. This has been made possible only by the extension of railways. A bushel of wheat is now carried by rail a distance of nearly 2,000 miles for 27 cents. To haul this distance by wagon would cost $5.25 per bushel. In the early days of railroads, especially those west from Chicago, wheat and corn were the principal staples carried. If the harvest was good, things went well; but if the farmers had a poor wheat or a poor corn crop, it affected the railways severely. It affects them yet, but if there is diversified farming, the farmer more easily recovers from the effects of a bad year, and if the railway has diversified farming, mines, quarries, and factories on its lines, it also gets over a bad year more easily. The railway managers, therefore, saw that they must not be entirely dependent on one crop, and took steps to bring about a change in conditions.

Systematic Work of Development.

We have to understand that the railroads always did welcome factories that came to them. But in this new policy they did not wait to welcome them, but

went after the business. The railroads said: "We must run our business just as every other manufacturer does—send our travelers to sell goods; advertise; tell what there is on the land; bring the water-powers into use; bring the coal into use; get brickyards to come." Then they thought: "What is the best thing to do?" The freight department might take it in hand, or the passenger department; but at last some one hit upon the idea that it would be better to put one man at the work, to organize it so as to bring about results. In other words, they were in the same condition as the manufacturer or business man is today. It is one thing to make goods and another to manufacture a market for them. This is the theory of modern business.

Organization Secret of Success.

The first thing in the railroad problem of development was organization. Take any railroad starting west from Chicago as it was some ten or fifteen years ago. The first thing was to take the territory in hand. The instructions of one man were to "jump on a train and look out of the window for about six months, and study our whole territory." He asked, "When do you expect results?" The railroad officials replied: "In about three years." "All right," he said; "you have the right idea."

Of course he did not merely look out of the window, but commenced to pay attention to business. The first thing was to get around to all the towns and get them to organize business-men's associations. There used to be in most towns a business-men's association. They generally had a billiard-room, and played a little whist,

and such things, but this developer said: "Gentlemen, we have got to get right down to business, and live up to your name. You must form a committee among yourselves. One man must find out all about the mineral resources around your town, and one man must find about the timber, and you must post yourselves as to what you have. We want to get all this information collected."

Education of the Business Men.

At that time most of the people around their own towns in the country did not know what their resources were in the first place. But at last organization secured the desired information. There are 5,000 or 6,000 towns on the great railways, like the Northwestern, the St. Paul, the Burlington. You can go today to any of these towns and say to some of the business men, "I want to start a canned-lobster factory," and the smart ones will say: "No; you cannot afford to bring the lobsters to the West to can them." But the next man says: "Mine is an excelsior factory." "All right," will be the reply; "you are the man we want. We have cottonwood around here in plenty, and this is the place to locate your excelsior factory." In most towns, thanks to the organization work done by the railroads, there is some one who can tell the resources, whether you can compete, and whether you can get a free site, and what you can do.

Publicity a Powerful Factor.

After thoroughly organizing the West, there was a lot of advertising in the East. Everything said was

taken with 90 per cent discount. The great center of manufacturing was around the Alleghenies. The manufacturers there had no idea that manufacturing could be done in the West. But the railway developers replied: "We can make steel rails in Chicago." That is a good argument, because it implies that coal and labor and iron and limestone and everything needed is there.

The first thing done was, for years, to advertise in the East just one plain statement—that the people were moving Westward; that the lands in the West were being settled; that great markets were being formed there, with great purchasing power; that the people were people of enterprise and would buy goods; that the Eastern man should go West.

Advertising on Impressive Scale.

One railroad kept that notice in its time-table, and issued forty thousand copies a month, for eight years; and somebody must have read it. Of one circular alone four millions were circulated in the East. You can see the effect. The people at Pittsburg had to sell their implements at a Chicago rate. So at last they began to say: "What is the use of being so far away from the market? The market is West; that is where they are growing wheat." So some of the agricultural implement men commenced to move. They were about the first to go West.

Result of Unsuccessful Experiments.

A man was experimenting in New York with flax. He had made a great deal of money in the South, and

had a fine laboratory in New York. "Why don't you come out West and see our flax?" he was asked. He wired that he would come on the next train. He did so, and started a plant up in Minnesota to make paper. But after trying it for a year, in 1892, he could not make it go. He had spent $60,000, without success, and the World's Fair was coming on, so he turned the whole plant into a furniture-tow factory, and in 1893 they made $20,000 or $30,000 out of furniture-tow, and they are making tow profitably yet.

A few years later the same man said he thought he could make mats from slough-grass. A railroad official took him all over the West to try to find the grass, and finally it was located at a place near St. Paul and also near Oshkosh. At Oshkosh he has employed 400 people for the last four years, and the same number at St. Paul, and is opening another plant now in the North.

Building Up a Big Industry.

Some years ago, there were a few sewer-pipe factories at Akron, and nothing farther West, and carrying the pipe to Chicago was about all the freight it could stand. There must be a limit to carrying cheap material. The people west of the Mississippi could hardly get sewer-pipe at all, except at high prices, because even the railroads could not make rates low enough on it. About this time, a man in Chicago went into a railway office and said: "I want to make a sort of conduit-pipe. We must put the telephones underground, and I want to find out from you where we can get a deposit of suitable clay."

"We do not think you can get it near Chicago, because vitrified clay does not exist here," said the railroad officials; "but we will try." So they wrote to 127 agents within a hundred miles from Chicago, asking, "Have you got anything in your locality in the shape of vitrified clay, or any good clay that will make brick? If you are too busy, please hand this to someone interested."

Eighty of these agents answered within a week—they had or had not. Some six answered in fourteen days, and about ten laggards answered in about three months. That happens when a man is dealing with large bodies of men. Three of the agents answered by telegraph, "We have blue clay." The manufacturer was invited to look at the clay.

Result of Systematic Effort.

The railway official thought, "We might as well spread this thing," and he picked up the Chicago directory and saw that there were eighty-nine brick manufacturers in the town. He wrote them all a nice circular letter, saying: "Blue clay has been discovered on the St. Paul road. We intend to run a special train next Wednesday at 10 o'clock; can you send a representative, or come yourself? If so, we will send a ticket." He received sixty-one answers; thirty-one acceptances, the others giving reasons why they could not go. Some argued that there was no use in putting brickyards out of Chicago. The railroad man notified the station agents to have the farmers dig holes to show the clay. He knew these farmers, and he wrote them: "The train will arrive at 10:15 and will leave your sta-

tion at 10:20, and if the hole is not dug we will pass on to the next station."

The result of the trip was that one man was induced to put a yard there, and it is running yet. About a month afterward, W. J. Alsip, a well-known brick man of Chicago who died recently, said: "One of my competitors has gone up on your road. I think I will put up a plant there." He sent a man up there, and he found a place just above this other yard, and they put up a yard that has always turned out from ten to twelve cars of brick a day. These men ship the brick to all the little towns around—Janesville, Rockford, etc.,—and this led again to other developments.

Development of Tannery Industry.

The next thing to do was to get timber known. Of course everybody knows that pine will sell, but there were a number of other kinds, like hemlock, which, fifteen or twenty years ago, had no particular market in the West. The tanneries at that time were mostly in the East, though there had always been a few around Milwaukee. The railways could not get northern Wisconsin settled, as the immigration agents said: "We cannot get any settlers, because we have no market for the timber they are clearing off." There was enough hemlock there to run all the tanneries in the United States for fifty years. This fact was advertised by the railways. In Pennsylvania the supply of bark was giving out, and would not last more than five or six years. That was twenty years ago, and they have lots of bark yet. But on this idea the investigation was made and all the data about how much hemlock

there was in Wisconsin collected. "How can we make this known through the East?" was the next question. It was solved by sending a news story to the Milwaukee *Sentinel.*

Assisted by Newspaper Men.

The man at the other end was a smart fellow. He was working for the newspaper, the writer was working for the railroad, but he saw that if they could get these tanners from Pennsylvania into Wisconsin they would sell more newspapers and get more advertising. So he took the article and put on big scare-head lines: "Wisconsin the Coming Place for Tanneries! Pennsylvania Tan-Bark Giving Out!"

Other correspondents and editors took it up and in a short time it was spread all over the country. The result was that a great tannery industry was built up in Wisconsin, to the profit of both people and railways. One man came from Boston and thought he would look at the bark. He had two cars of it shipped East, sampled it, said it was all right, went back, and established a big tannery at Merrill. Today the United States Leather Co. has its tannery at Warsaw; the American Hide & Leather Co., at Merrill, and the Eastern & Western Tanning Co., at Tomahawk. The Wisconsin Central later put a commissioner at work, and he has more than duplicated the work done by the St. Paul road.

Origin of Wisconsin Paper Mills.

In 1891 the first paper mill was established on the Wisconsin river. Today there are many paper mills

there. Another man tried an experiment, and thought he would make paper with hemlock. He argued: "It's the very thing for me; the tanneries will take the bark and I will take the logs." And that has been done since then. He went up and took the logs that the farmers had peeled. Everybody knows now that the paper industry of Wisconsin is a big thing. The railways "did it."

Hotels came next. It was essential in the carrying out of railway development plans that prospective investors should have decent hotel accommodations, so one of the first things the railways had to do was to encourage good hotels through the West. At Marinette, before this was done, you could not keep a man twenty-four hours; no Eastern man would stay. The business men were called together, and they said: "We will subscribe $75,000 to a hotel. If we make 6 per cent, all right; if we make 5 per cent, or 4 per cent, all right; but we will have the hotel"—and they built it. The same was done in other cities. Investors found the "frontier" fairly comfortable. It was a big factor in inducing them to put their money into enterprises, which are yearly growing larger and adding wealth and population to the West.

Moved by Selfish Motive.

In all this work of development, of course, the railways were governed by a selfish motive—they wanted the increased traffic which development would bring, and they got it. In the securing of this increased, and

ever-increasing, traffic, the railroads, perhaps, "builded better than they knew." What if they did? The benefits thus obtained are universal. It is not the railroads alone that are reaping the profit.

"In the passing of a generation, as it were, the railroad and the steamship have transformed the whole realm of industrial and social life. They have enriched every occupation, given multiplied value to each pursuit, added incalculably to the means of human enjoyment, made our vast wealth possible. They are at once the greatest achievement and greatest necessity of our modern civilization. But we do well to remember that this marvelous achievement has been accomplished by private enterprise and private capital, and that we must look—we certainly should look—to that same source for its further and adequate development. Far distant be the day when any thoughtful man will seriously contemplate a different national policy."—*The Hon. Martin A. Knapp, Chairman of Interstate Commerce Commission.*

CHAPTER XI.

TRAINING OF RAILWAY MECHANICS.

The problem of effectually supplying the ever-increasing demand for skilled and thoroughly trained mechanics has been constantly in the foreground and for some years past has caused a great deal of anxiety to the heads of all large industrial corporations, and everywhere was heard sighs of regret that the ranks of the good mechanics were being rapidly depleted.

Realizing that this was in part correct, the Grand Trunk Railway some years ago endeavored to fill the breach and pioneered a movement which has since been copied on a minor scale by all the great railroads of Canada and the United States, as well as the largest manufacturing firms in both these countries, namely, the technical training of their apprentices.

Benefits of the System.

The average boy, who from force of circumstances had to leave school in the early stages of his education and take up his life work, had little to look forward to in the matter of education, except by years of unremitting toil, unassisted, unrewarded, and finally arriving at a smattering of a few primary subjects imperfectly learned.

With this problem before it, the Grand Trunk Railway started a class for its apprentice boys, who were eager to learn; commenced to teach subjects which at

once aroused interest among the boys, bearing as it did on the every-day needs of mechanics. In a surprisingly short time, the desire for knowledge being whetted, it was found necessary to increase the scope of the teaching, as the apprentice boy of the day saw within his grasp the very highest position of responsibility in the management and operation of the road. He realized that here was an opportunity to obtain an education little short of a college course, with a minimum exertion on his part and at the same time be independent and self-supporting.

Graduates Get Good Positions.

From the commencement on a small scale, the system has grown until at the present time these technical schools are spread at all important centers throughout the entire Grand Trunk System and hundreds of scholars are enrolled, whilst every large railway system of this continent boasts several of the G. T. training schools as their chief mechanical engineers, and more than one of our largest industrial concerns have graduates as their chief draughtsmen.

Outline of Curriculum.

The subjects taught are graded to suit the student's ability, and in dozens of cases boys who left school when in the second book can now do problems which would tax the powers of a high school graduate to the utmost.

The subjects taught comprise everything from simple arithmetic to higher mathematics, mechanics, machine design and mechanical drawing, and so well has the course been graded that numerous requests from me-

chanics' institutes and even our largest technical colleges have been received for complete sets of instruction books.

The entire cost of education at these training schools is borne by the Grand Trunk System, which furnishes all the equipments and engages the instructors, who must themselves have had a thorough technical and practical training, so as to enable them to anticipate the needs of the apprentices.

How Boys are Rewarded.

Further encouragement is given the boys to learn by the large number of prizes donated annually, open to competition to all classes on the system, and include free scholarships in engineering at McGill University, as well as handsome cash prizes.

These prize competitions are held at different centers, to which the best students at the several centers are invited, free transportation, entertainment and all expenses being borne by the company.

The appreciation of individual promotions forms one of the strongest features in the system and serves to keep alive the keenest interest in the classes, as the boys realize that as soon as they arrive at a certain standard of excellence increased pay is their reward, and many of our foremost students of political economy see in this system, as it is being carried out, the future supply of skilled mechanics, master mechanics, superintendents, etc., being carefully husbanded, and an effective solution of the labor problem, namely, the prompt recognition of individual merit.

Compulsory Classes in Drawing.

For two evenings per week during the fall and winter months he must attend mechanical drawing classes,

study of practical mechanics and elementary electricity, the most competent instructors procurable being provided. On the staff are two graduates of American and Canadian engineering colleges, Purdue and McGill. The work in the drawing class is outlined in a special text book written by the company's chief draughtsman at Montreal, who is also the author of the book used on practical mechanics.

During the term frequent examinations are held, and the points gained by each boy are posted so that they may all keep advised as to just what progress they are making, and thereby be able to brush up the weak spots that the examinations have disclosed.

Prizes for Best Work.

The annual competitive examination is always conducted by the company's chief draughtsman from Montreal, and occurs at all the large shops along the system. Prizes are awarded to the apprentices obtaining the highest average in their respective years. These prizes amount to $40 for each shop, and are distributed over the different years of apprenticeship.

In addition to the prizes as stated above, there is a capital prize offered of $25 for each subject. This is competed for by the apprentices obtaining the highest averages in drawing and practical mechanics at their respective stations. These apprentices are given a trip to some point on the system where the final examinations are held, and the one receiving the highest number of points in each subject receives the amount stated. This, in addition to what he has already received at his

station, will make a total of $29, $33 or $58, if he has been successful in all subjects.

After the season has closed, the boys at some of the large shops hold what is termed "Apprentice Night." This is the social event of the season. Each one makes a drawing, which is neatly gotten up and inked in. This is placed on exhibition, and the prizes are awarded for each year of apprenticeship.

Method of Apprenticeship.

The form of apprenticeship which has been adopted by the Grand Trunk Railway System has been in successful operation for a number of years and has been the means of supplying that company with skilled mechanics in the most satisfactory manner. All apprentices are indentured to the machinist's trade for five years, and to the blacksmith's, boilermaker's, or other trades for four years. Five cents per day is deducted from the wages of each apprentice, and the total amount is returned to him at the expiration of his apprenticeship with an addition of $25 as a bonus if his services have been entirely satisfactory.

The first requisite in employing an apprentice is to know that he is morally, physically and mentally capable of filling the requirements of a mechanic. To ascertain this the apprentice is required to make his application direct to the master mechanic or the general foreman, and to be not under 15 or over 18 years of age. He is required to undergo a medical examination so as to assure the head of the department that he is healthy and likely to be able to follow up the trade after he has completed the term of apprenticeship.

Examination of Applicants.

This information being satisfactory, he has to pass an examination in the master mechanic's or general foreman's office. This is usually conducted by the chief clerk or some person specially appointed for that purpose, as follows:—

To be able to read extracts from instructions from end of employees' train time-table, as, per example, standing thirty inches from same:—

All the apprentices of this Company must be able to read the rules readily. Regulations are published from time to time and workmen are expected to acquaint themselves with them.

To be able to hear the ticking of an ordinary open-face watch at a distance of four feet.

By writing a letter, from dictation, applying for employment in the shops, as, per sample:—

Mr.....

.....

Dear Sir,—

I am desirous of entering the service of the ..... Railway as an apprentice in the shops at..... I am .....years of age and in good health and free from bodily defects. When I left school at.....I was in..... grade (or form). Since then I have been employed as follows: .... Should you accept this application, I will promise faithfully to conform to the rules and regulations of the..... Railway, and try to become a first-class mechanic.

Yours truly,

.....

To be able to work out correctly similar examples to the following:—

Multiply 122,983,672 by 527,001.

Divide 723,643,978 by 365.

Books for Further Instruction.

The apprentice, after having passed a successful examination, is provided with a text-book for his instruction and guidance. This book contains examinations for the apprentice for each promotion he takes while serving his apprenticeship, and if he fails in any of these examinations he is set back to his old position for another term and the next apprentice in turn is promoted ahead of him, provided the next apprentice passes a satisfactory examination. When another promotion is necessary the apprentice who failed is given another opportunity to qualify. If he fails the second time he is either dismissed from the service or given some minor position he is capable of filling outside of the trade, as it is concluded that he is either not sufficiently intelligent or too indifferent to make a mechanic.

After passing the first or entrance examination in the master mechanic's or general foreman's office the apprentice is sent out to the boiler, blacksmith or coppersmith shops, or other shop as may be required. He stays there from six to nine months, and is taught to be active and obedient and to prepare himself for future promotions.

Questions from Text-Book.

Following are a few samples of the contents of apprentices' text-book:—

Q. What is the weight of standard shop hammer (machinist's hand)?

A. Two pounds.

Q. At what point should hammer be held for efficient service?

A. At the extreme end of handle.

Q. What is the standard length of hammer handle?

A. 15 inches over all.

Q. How many classes of drills are in general use in this shop?

A. Two, viz.: Flat and standard twist drills.

Q. At what degree is cutting end of twist drill ground?

A. 59 degrees, measuring angle from center line of drill.

Q. Name the speeds for drilling brass, cast iron, wrought iron and steel, different size holes, with carbon steel drills, and air hardened steel drills.

A. As per table and as much faster as drill and material will permit.

Q. Give the correct speeds for a 1-inch carbon steel drill in iron or steel and brass.

A. Iron or steel, 115 revolutions equal to 30 feet per minute; brass, 558 revolutions equal to 153 feet per minute.

Q. Give the correct speed for a 1-inch high speed steel drill in iron or steel and brass.

A. Iron or steel, 191 revolutions equal to 49 feet per minute; brass, 781 revolutions equal to 204 feet per minute.

Q. What lubricant is used for drilling wrought iron or steel?

A. A mixture of 1 lb. soft soap, ¼ lb. soda, 1 pint oil to 2½ gallons water, or such other lubricant as may be furnished.

Q. What is a center punch used for?

A. Marking center of holes for drilling and indicating lines on other machine work.

Q. What is a round nosed chisel used for at drilling machine?

A. Drawing centers.

Q. Which side of a belt should be run next to pulley or cone?

A. Smooth or grain side.

Q. What are the general rules to be observed regarding cleanliness and care of machines?

A. All cuttings of different materials are to be kept separate. Machine to be thoroughly cleaned once per week in addition to ordinary daily cleaning, and all working parts kept properly lubricated. Marking or defacing machine in any way to be carefully avoided.

Q. Explain the reading of an ordinary standard measuring rule?

A. Apprentice will explain practically from rule.

Q. How many, and what are the names of the different classes of calipers in general use on drilling machine?

A. Three, inside, outside, compass or hermaphrodite.

Q. What tools are necessary for laying off and measuring work at drilling machine?

A. Inside, outside and compass caliper, dividers, center punch, rule, square and surface gauge.

Q. What is a jig?

A. A device for standardizing and duplicating parts, and is a casting or plate fitted with hardened steel bushes which form a guide for drilling, slotting, turning or planing.

Purpose of the Text-Book.

The object of the text book is to have the boy theoretically conversant with the work that is going to be done by him after his next promotion. For instance, a boy going from the blacksmith to machine shop has to pass his examinations before he is accepted in the machine shop, which is called "Examination for promotion of apprentices from other shops to the machine shop." As he is usually put on a drill to commence with, by studying his text book he learns considerable about it, and also the tools he is to use in connection with it. The same practice is followed throughout the whole term of apprenticeship, and while the apprentice is working at one machine he is studying as much as possible about the machine he is to go on next. One of the great advantages of this system is that it gets the apprentice thinking, and leads him to reading up in line with his work.

Advantage of Indenture System.

The indenture system has been found of great advantage both to the company and the apprentice. It has a tendency to keep the apprentice satisfied, and steady his energies along the required lines. It also prevents him from being tampered with by outside firms or corporations who desire to obtain the services of the boy as soon as he has become useful to the company which has instructed him.

At the completion of his term each apprentice receives a certificate showing that he has served as an apprentice and as a mechanic in the branch of trade that he was apprenticed to.

An apprentice is required to serve five years at the following rates: 8c, 10c, 12c, 15c and 17c per hour. Before he is granted each year's advance he is required to pass a written examination on shop work, also make a drawing of some detail part of a locomotive, as specified in the apprenticeship book, which examination and drawing must have the approval of the master mechanic and the superintendent of motive power before his advance is allowed.

All-Round Competency Secured.

This system insures thorough education in all details of the trade, and while some of the work may be specialized it is not done by the apprentice until he becomes a journeyman. For instance, the apprentice comes from the boiler shop to the machine shop, from the machine shop to motion bench, to the side rod bench, to the axlebox gang, to the steam pipe gang, to the valve gang, and finally to the erecting gang, so that after an apprentice is out of his time he is a specialist in any one of these branches.

This system of apprenticeship on the Grand Trunk has also been found to be the means of parents giving their sons who desire to enter the service a better education than formerly. Before its adoption the only requirement was that the boy had to be 15 years of age. It was found that parents took their boys away from school at 12 or 13 years of age, and put them at some other work until old enough to enter the Grand Trunk shops. When the examinations were first inaugurated, quite a number of the boys were turned down, and had

to go back to school again before they could qualify to enter the service.

Status of Apprentice Improved.

This has not only resulted in prospective applicants getting a better education, but has elevated the moral standing of the apprentices' work, and made the system attractive to boys who have passed the high school entrance examination, and who, although well advanced along the lines of school education, adopt the mechanic's trade in preference to other pursuits.

In conclusion, the success of the apprenticeship system is imperatively dependent upon the careful management of the examinations, and the compulsory attendance at the classes provided by the company for their education.

CHAPTER XII.

RAILWAY SITUATION IN CANADA.

Railway transportation in Canada at the present time (1916) is deeply affected by extraordinary conditions arising from the European war. The effects of the great struggle, in which Canada, as an integral part of the British Empire, is an active participant, are apparent both in the extent of railway construction and in the results of railway operation.

For a number of years prior to the Great War, Canada had been taking giant strides in railway construction. In 1914 the addition to operative mileage was 1,491 miles, bringing the total up to 30,795 miles. This is considerably more than the mileage of the United Kingdom, and raises Canada to fifth place among the nations of the world in the matter of railways. The increment during the ten years including 1914 amounted to 11,364 miles of line.

While the distribution of this new mileage has affected all the provinces, the west has had over 70 per cent of it. That is where the need of the Dominion for railways has existed, and still exists, as the result of rapid settlement. It should also be mentioned that during the last year of which there is an official report 309 miles were added to second track, making the total 2,293, and 583 miles to yard track, the aggregate of which was thereby brought up to 7,518 miles.

Perhaps more striking than the additions to operative mileage in 1914 are the facts with regard to Canadian lines under construction. The situation on June 30, 1914, compared with the same date in the previous year, was as follows:

	1913	1914
New mileage surveyed	6,558	11,472
Under construction	8,591	5,521
Completed	2,956	3,417
In operation	542	2,443
Total	18,648	22,853

The mileage noted as "in operation" refers to mileage which had not in 1914 been taken out of the "under construction" classification. It is quite a common thing for the Canadian Railway Commission to permit parts of new lines to handle traffic pending completion of the whole, and also to allow completed railways to be operated for a limited period by the contractors. It is reasonable to assume, however, that at least 10,000 miles of new line now in various stages of construction will be added to official operative mileage within the next four or five years. Of course, at this juncture, no one may say what effect the war in Europe will have on the whole railway situation, especially with respect to the availability of capital.

Increased Capitalization.

Building railways nowadays is an expensive proceeding, and it is therefore not surprising that the capitalization of the Canadian system was increased by $276,990,000 during 1914. This increment consisted of

bonds, $169,145,686; common stocks, $97,794,137; and debenture stock of the Canadian Pacific Railway, $10,050,246. By these additions the aggregate liability of the Canadian roads was brought up to $1,808,820,761. In addition there were stocks amounting to $64,637,500 and bonds totaling $88,669,809 attached to lines officially regarded as being under construction; so that the final total would be $1,962,128,070. It was definitely ascertained when the last report was made that the interest on all outstanding bonds was paid.

Dividends for the year ran up to $30,434,601, as compared with $27,333,373 in the previous year. The force of these figures is accentuated by the fact that seven years before the aggregate of dividends was $12,760,435. The funded debt in 1914 amounted to $23,481 per mile of the lines affected, which cannot be regarded as high. Stocks had an average of $30,138 per mile.

Government Aid to Railways.

The policy of aiding railway construction continues in Canada, and in 1914 the largest expenditure for that purpose was made since government subventions were begun. Direct cash subsidies amounted to $16,583,059, of which all but $523,260 came from the Dominion treasury. That, however, fell far short of the contributions which were made by the Dominion and the provinces in the form of guarantees of bonds. Parliament voted $45,000,000 of guarantees to the Canadian Northern in May, 1914, following very much larger assistance to that company in subsidies and indorsements in preceding years. The total account for guarantees having legislative authorization reached $406,259,165

on June 30, 1914, of which $188,965,063 stood in the name of the Dominion. The western provinces are chiefly involved in connection with the remainder, and as these guarantees are precisely like the indorsements made in everyday life of promissory notes, it will be seen that the situation would be exceedingly serious if default should be made by the railways concerned.

These obligations, however, represent two things: The optimism of the West and the need for transportation facilities. And, as Mr. J. L. Payne, Comptroller of Statistics in the Department of Railways and Canals at Ottawa, said recently in an article for which we are indebted to the leading journal of American transportation, the Railway Age Gazette:

"Under normal conditions nothing more will happen than happens when one friend indorses for another. The West will get its railways—has, in fact, already got thousands of miles of new line by that process—and the railway corporations will pay principal and interest. The emphasis is on the word 'normal.' It must also be borne in mind, before the attitude of the Canadian people in respect of transportation is understood, that the Dominion government is building the eastern section of the Grand Trunk Pacific, and has expended on that account $150,000,000; that it has guaranteed the bonds of the Grand Trunk Pacific for the construction of the western section, and had actually purchased $33,116,000 worth of these bonds up to June 30, 1914, in order to secure par value for the company."

Railway Earnings and the War.

The great European war is, incidentally, emphasizing

in Canada the intimate relation between trade and traffic. "Railway earnings are barometric," says Comptroller Payne, "in their reflection of the commercial activities of a people. They go up or down with the fluctuations of trade. This is not generally understood. It cannot be, or there would be a better and saner appreciation of the functions of our great carrying agencies.

"When earnings are on the ascendant, there are many who fail to see in that fact the throb of national strength and success. They are apt to cry out that the railways are wringing too much from the people and must be restrained; but in a day of adversity, when earnings come tumbling down, they are not sympathetically disposed toward the hard-hit railways. There seems to be lacking that judicial view of the case, which recognizes the soundness of balancing good years against bad years."

The railways of Canada did not earn quite as much in 1914 as they did in 1913, and in 1915 and 1916 they will inevitably run considerably below the record for 1914. This loss will fall upon the people at large with just as much severity as upon the railways. There is no industry, not even agriculture, which makes such a wide distribution of its prosperity as does the railway industry, and it is equally true that the pinch of railway poverty is as quickly diffused among all classes of the community. Under present conditions, therefore, Canada has had to learn a new lesson.

Decline in Net Earnings.

For more than thirty years, with the single exception of 1909, railway earnings in Canada have mounted up-

wards. During the past ten years in particular they have made sensational leaps. It came therefore as somewhat of a shock—a disturbing departure from what was accepted as the established order—to find that for the year ended June 30, 1914, there was a decline of $13,619,164, or from $256,702,703 in 1913 to $243,083,530 in 1914. Operating expenses, on the other hand, were reduced by only $3,036,431; so that net earnings, as represented by the difference between gross earnings and operating cost, fell off by $10,582,733 for the year. This result created a serious jump in the ratio of operating expenses to gross earnings. That ratio in 1912 was 68.7; in 1913 it rose to 70.9, and in 1914 to 73.6.

Of course, this setback happened, as has been pointed out, after a long period of really remarkable progress. That progress is strikingly demonstrated in the following statement of gross earnings per mile, which has not been included in the official reports:

1899	$3,608	1909	$6,018
1904	5,158	1914	7,894

The decline for 1914 was equal to $866 per mile. The story is succinctly told in the following comparison of the sources of earnings in 1913 and 1914:

	1913	1914
Passenger service	$ 74,431,994	$ 72,564,203
Freight service	177,089,373	165,753,731
Station and train privileges	1,566,721	1,044,737
Telegraphs, rents, etc.	3,614,615	3,720,868
Total	$256,702,703	$243,083,539

The principal falling off was in earnings from freight

service, which was due to the hauling of 5,598,721 tons less than in 1913. The number of passengers carried was actually some 471,515 more than in the preceding year, yet the volume of earnings from ticket sales declined by $2,429,134. The reason for this is found in the fact that the average passenger journey fell from 71 miles in 1913, a comparatively high average, to 66 miles in 1914. That little five miles seems to have cost the railways nearly two millions and a half of dollars.

Public Service of the Railways.

The following condensed facts with respect to the public service of Canadian railways in 1914 may illuminate the whole traffic situation in the Dominion at the present time:

Tons hauled	101,393,989
Passengers carried	46,702,280
Tons one mile per mile of line	716,359
Passengers one mile per mile of line	100,309
Receipts per passenger per mile, cents	2.007
Receipts per ton per mile, cent	.742
Average receipts per passenger	$1.328
Average receipts per ton	$1.614
Passengers per train	59
Tons per freight train	353
Tons per loaded car	19.18
Cars per freight train	18.4
Average freight haul, miles	217

Railway Interests Centralized

There is a continuing tendency in Canada to centralize its railway interests. In 1914, for example, 79 per cent of all traffic and earnings attached to three cor-

porations—the Canadian Pacific, the Canadian Northern, and the Grand Trunk. The Grand Trunk Pacific is counted in with the Grand Trunk. If seven other units be taken in, the ratio rises to 92 per cent, leaving but 8 per cent for all the remaining lines, nearly ninety in number.

This work of absorbing the carrying trade into relatively few hands has been proceeding for a number of years, and has not aroused serious opposition. The conviction obtains in the communities more or less directly affected that it has contributed to better service, without in any degree causing higher rates.

Freight Rates in Canada.

Taking up briefly the broad question of freight rates in Canada, it may be noted that the average receipts per ton per mile in 1914, by all the railways of the Dominion, were 0.742 cents. There has not been any material change in this fundamental factor during the previous eight years, and information back of that period is not available.

The tendency in rate adjustments has for a long time been downward, and while earnings were rising steadily, as the result of swelling traffic, it would perhaps have been unpopular to permit increases. "Happily," says Comptroller Payne, "Canada escaped the two-cent-per-mile passenger rate agitation which overwhelmed so many of the state legislatures across the boundary, and carried in its train a mass of admittedly meddlesome and restrictive legislation affecting railways."

The rate situation in Canada may be summed up in

this conclusion: While freight rates have not in any direction been increased, there have been numerous specific reductions and also changes of classification; so that, on the whole, there has been a slight impairment of earning power. This was not resisted by the railways while the tide of prosperity was running high; but the whole matter may assume a different complexion, and properly so, in the face of serious reverses. Since the outbreak of the war, there have been heavy declines in earnings, and no one may say when the trend will turn upward. Of course, the productive potentialities of the Dominion cannot be destroyed, and the return to normal conditions is obviously a matter of time; but, without reference to how and when the volume of traffic will be restored to former levels, fair play demands that the persistent rise in the cost of operation should be recognized in its full bearing on rates.

Whereas in 1899 it cost 77.9 cents to run a train one mile in Canada, in 1914 it cost $1.66—an advance of 113 per cent. During the same period earnings per train mile increased by precisely 89 per cent. Such a disparity could only be endured by the railways under very favorable conditions. Should the very unfavorable conditions which have been created by the war and other causes persist for a term of years, it is clear that the railways will be compelled to take broad and comprehensive measures for either the betterment of earnings or the reduction of operating expenses. The larger not only began in 1915 the cutting down of their working staff where possible, coupled with the elimination of certain trains and other services, but they also an-

nounced the imperative need for a recasting of the scale of compensation to employees.

Vitality of Canadian Roads.

The vitality and soundness of a large group of railways may properly be tested by the same standards which are applicable to any one of the units. That is to say, a railway would be regarded as strong and prosperous, if its operating expenses fell sufficiently far below gross earnings to leave a fair balance after fixed charges had been met, provided always—and this is absolutely vital—that the balance to profit had not been realized at the expense of physical property.

The railways of Canada would not shrink from such a test. Indeed, they appear to advantage when it is applied. In 1914 the ratio of operating expenses to gross earnings was 73.63 per cent, and that result was achieved after more than ordinary expenditures had been made for the upkeep of roadbed and equipment. In other words, net earnings have not been the result of an unsound policy with respect to operating conditions.

Expenditures for Maintenance.

During the five years ending with the period of the last official report, the outlay of the Canadian railways for maintenance of way and structures averaged 21.92 and 20.42 per cent. respectively, of total operating expenses, and that is somewhat better than the average of United States railways during the same period.

In 1914, for example, $35,292,227 was expended on way and structures, and $36,375,331 on maintenance of equipment, these outlays being equal to $1,146.07 per

mile of line in the first case, and $1,181,121 in the second. It can be fairly said that there has been a persistent movement toward the best standards in all service conditions, and Canadian railways do not in any respect fall below those of the United States in all that makes for general efficiency and comfort.

The additions to rolling stock made by Canadian roads during the three years ending 1914 have been as follows: Locomotives, 1,228; passenger cars, 1,849; and freight cars, 77,032.

Quite as important as numbers has been the rising scale in capacity of both hauling and carrying units. For example, the average capacity of a car in freight service in 1907 was 27.6 tons. In 1914 it was 33.2 tons. Likewise, the average trainload has been raised from 260 tons in 1907 to 353 tons in 1914. The direct effect of recent large additions to equipment has been to completely silence the general outcry against car shortage which had been heard for many years; but, owing to perhaps unavoidable, but nevertheless wasteful, marketing conditions, this has been achieved at the expense of loading the railways with a heavy surplus of cars during at least four months in the year. Some of this new rolling stock came from the United States. The official return of imports from across the line for 1914 shows that Canadian railways brought in 166 locomotives, 208 passenger cars, 4,596 freight cars and 4,113 other cars from the American side, which made up a total account of $7,987,877.

Future Depends on the War.

The Great War, following closely upon a lull in high

pressure traffic conditions—a lull which might have been wholly temporary—has disturbed the fundamentals of commerce in Canada. One does not, however, see the effects very plainly as yet. Production seems to be proceeding. There are not many industrial establishments idle. Business is apparently being carried on as usual.

But the railway barometer tells a plain story of depression, and it is infallible, as the able Comptroller of the Department of Railways says. "The pinch here and the slackness there are reflected from ocean to ocean in lowered freight earnings. There may not be discouragement—you certainly would not hear anything pessimistic in Canada at this time of trial—but everybody realizes that economy is necessary. At the foundation of nearly all great commercial upheavals one may find uncertainty, and that word expresses the situation just now in Canada.

"So far as the railways are concerned, they cannot possibly escape the constriction; and the hard part of it is that, while many begrudged them a reasonable share in the prosperity of the past decade in particular, they will look in vain for general sympathy in any distress which the great European war may force upon them. War is not like any other disturbing influence. Neither its duration nor its consequences can be gauged. Under such abnormal conditions no one may say what will be the position of Canadian railways even in the near future. Everything depends on what happens in Europe."

CHAPTER XIII.

RAILWAY MAIL SERVICE.

At the time our first railroads were opened, the mail was carried on horseback, by sulkies, stages, four-horse post-coaches, packets and steamboats. As the cities which could be served by steamboats were few in number, the expedition that could be given the mail was measured by the speed and endurance of the horse. In favorable weather, when the roads were in good condition, mails were carried with fair dispatch, and delivered promptly at the appointed time.

During a portion of the year 1833 the express mail was carried from Philadelphia to New York, a distance of ninety miles, in six hours, at an average speed of fifteen miles per hour. But this, of course, was an extraordinary performance and was only warranted by the disturbed and excited condition of public affairs that then prevailed.

This presents one extreme. The other shows the all but impassable roads of the wet seasons, the heavy stages and post-coaches scarcely moving, often down to their very axles in the mud, at the rate of three or four miles per hour.

Railways at First Unreliable.

Such being the condition of affairs, it would naturally be supposed that the mail would have been wholly transferred to the railways as soon as the latter began opera-

tions. But such was not the case. For several years the railways seem to have been no more expeditious or reliable than the post-riders, stages, and post-coaches. As late as the year 1835, or six years after the successful trial of the "Stourbridge Lion" at Honesdale, the postmaster-general threatened to remove the mails from several of the leading railways unless they were forwarded with greater expedition and certainty.

Two Early Speed Contests.

This threat to remand the mail back to the stages may seem strange in view of the records made in the two famous prize contests of Great Britain and the United States. As early as October, 1829, in the great Rainhill competition, brought about by the Liverpool & Manchester Railway, Stephenson, with the "Rocket," is said to have attained a speed of twenty-nine miles per hour. This record was soon equaled in our own country. During the summer of 1831 there was a contest just outside of Baltimore for the prize offered by the Baltimore & Ohio Railroad. One of the contesting locomotives, "The York," built by Phineas Davis, of York, Pa., was found capable of running a short distance on a straight and level stretch of track at the rate of thirty miles per hour.

Speed of Best Modern Trains.

The best locomotives now manufactured can attain and hold a speed for a short distance of certainly 90, and perhaps even 110, miles per hour, but the average running-speed of our fastest trains falls far short of even the lower of these figures. The running-speed of

the fastest regular trains of the United States—and, it might be added, of the world,—namely, those between Atlantic City and Camden, is 66.8 miles per hour. This run is, of course, only a dash, the distance by the longer route being but 59 miles, with no stops between the termini. The running-speed of the Empire State Express on its journey of 440 miles from New York to Buffalo, deducting 8 minutes for the four station stops it makes, is 54.2 miles per hour, while the running-speed of the Northwestern and Burlington fast mail trains on their journey of 490 miles from Chicago to Council Bluffs, allowing 35 minutes for thirteen station stops, is 51 miles per hour.

When Horse Defeated Engine.

It was not until the first railways had been in operation for several years that the locomotive fully established its superiority over the horse in point of speed and reliability. Shortly after the opening of the first section of the Baltimore & Ohio Railway to Ellicott's Mills, in the summer of 1830, Peter Cooper, running the "Tom Thumb," a locomotive of his own construction, was distanced by a powerful gray horse drawing a car, which, by this victory, became famous and later played a conspicuous role in the public prints and early books on travel. Of course, Cooper's discomfiture was due to an accident, the slipping of the belt that operated the blower. This, however, only emphasizes the point that the locomotive could not at that time be counted on for regular performances. In this contest Stockton & Stokes, the owners of the horse, undoubtedly did their best, for they were the great stage-owners of that day

and were determined not to let their mail contracts slip away from them without a supreme effort to retain them.

First of Special Mail Service.

On November 24th, 1837, it was ordered by the postmaster-general that one Hutchinson be offered $350 for the conveyance of the president's message, on the first Tuesday in December, by express mail from Washington to New York. This mail was to leave Washington at noon and reach New York at 4 a. m. the next day. As the distance was about 230 miles, the average speed stipulated was a little less than 14½ miles per hour.

On December 12th, 1838, the postmaster-general approved the arrangement of the postmaster at Philadelphia for carrying the president's message by special mail on the railroad from Philadelphia to New York in five hours for $500. In 1833 the mail was carried between these cities by the post-riders in six hours.

As late as 1839 the mail trains on the South Carolina Railroad averaged less than 11 miles per hour in running from Charleston to Hamburg, a distance of 138 miles.

Roads Had No Connecting Schedules.

The running schedules of the railways in those days seem to have been drawn up with the idea of making the breaks in travel as frequent and as long as possible. The traveler from Washington to New York, on arriving at Baltimore, would be likely to find that the train for Philadelphia had just departed, and on arriving at

Philadelphia he would be likely to find that the train for New York had just gone. Movement of trains during the night hours was very limited, and on almost all railroads was wholly suspended.

As late as October, 1841, some of the railways refused to adopt schedules urged by the postmaster-general which would have very materially expedited the mail between Boston and Charleston, because they called for night running. Shortly before this, one railway offered to carry the mail with night service at $300 per mile per year, and for $200 if the department would so arrange the schedules that the running would fall entirely between sunrise and sunset.

First of Real Mail Service.

By 1850 a few railways for the accommodation of through mail and passengers ran trains at 25 miles per hour. While this would not now be looked upon as rapid running, it represented a material improvement, and was fast enough to win the traffic for the railways. In 1860 the postmaster-general reported that an experiment was made with a night mail between New York and Boston. The time between these two cities was reduced to nine hours. The distance being about 230 miles, the average speed maintained was but little more than 25 miles per hour. The service between New York and Washington was not so satisfactory as that between New York and Boston. Twenty miles per hour seems to have been all the department could secure from the railways forming the New York-Washington route.

Old System of Handling Mail.

The method of handling the mail in existence anterior to the introduction of the railway postoffices was built up about what were known as distributing postoffices. From the earliest days until the introduction of the railway postoffices, the great problem which constantly vexed the postoffice officials was the sorting and pouching of the mails. Before the mail can be started on its journey, it must be pouched. Now, obviously, there cannot be so many pouches as there are places for which the mail is destined, because, among other reasons, the weight of the pouches would be so many times the weight of the mail that the means of transportation would be broken down. In many cases there would be a pouch for one letter. Under such a system the aggregate gross revenues of the Postoffice Department for many years would not suffice to pay for the pouches. That these statements are true becomes apparent on a moment's reflection on the final destination of the enormous number of pieces of mail sent out every day from the Chicago and New York postoffices.

The Distributing Office System.

As the tide of emigration spread over the Mississippi Valley, and the number of postoffices multiplied, distribution became more and more difficult. Direct pouching, from each office to every other office for which there was any mail, became more and more impossible, because of the number of pouches that would be required. To keep down the number of bags the mail was now sent to the distributing postoffices from all

the offices in the territory of which this office was the center. Here the whole mass was sorted and pouched, and then shipped to the various distributing offices scattered about the country, each one of which acted as a distributing center and made up and forwarded the mail to the smaller offices grouped about it.

Abuses In the Old System.

The emoluments derived by the postmaster at distributing offices consisted of a commission on the letters distributed. Originally, the commission was 5 per cent on letter postage, paid and unpaid. This was afterward increased by law to 7, and later to 12½ per cent. It was thus obviously the interest of the postmasters of these offices to increase their distributing business to the utmost; and, though expressly forbidden by the department to invite mail from its legitimate channel, this was nevertheless often done. Letters were frequently subjected to so many distributions that the postage paid on them was entirely eaten up. In some cases the commissions of the postmaster greatly exceeded the entire proceeds of his office, and a balance had to be paid him from outside sources.

The Work of Reform Begun.

In 1851 and 1852 the postmaster-general made a strenuous effort to correct these evils and abuses. He framed regulations designed to cut off unnecessary distribution, with its train of evils, and even went so far as to remove summarily several conspicuous postmasters for violating his instructions. The work begun by Postmaster-General Hall was carried on with vigor

by Judge Campbell, who became postmaster-general in 1853. He caused copies of the distributing schemes used in the distributing offices, which were then about fifty in number, to be sent to Washington for examination.

Railway Postoffices Suggested.

Mr. Henry A. Burr, the topographer of the department, to whom they were referred, found nearly all of them grossly defective and productive of unnecessary distribution, with its attendant delays and expense. By direction of the postmaster-general, Mr. Burr prepared new schemes, but in submitting them he expressed the opinion that, so long as the mails were stopped in transit for separation, no scheme of distribution could be devised which would give dispatch, or prevent passengers and express matter from outstripping the mail. The only effective remedy was the abrogation of the distributing postoffices and the transfer of the work of separation to "over the car wheels," as he expressed it. But the force of progress was yet too feeble to take this radical step.

Abolition of Distributing Offices Begun.

In 1857 another step forward was taken. In this year the number of cities to which there was direct mailing was greatly enlarged, and on the trunk lines the mails were placed in charge of what were known as "express agents," who went with the mail and saw that the pouches were properly transferred at junction points. This practice very largely reduced the quantity of mail that had to percolate through the distribut-

ing postoffices, and, so far as it extended, prevented passengers and express matter from making better connections and thus outstripping the mail. Direct mailing proved successful; it was so far extended by 1859 that thirteen of the fifty distributing offices were found unnecessary and were accordingly abolished.

Start of the Present System.

In July, 1861, the overland mails began to be carried over the Hannibal & St. Joseph Railroad, this being the first railway to reach the Missouri River. The railroad being new, and the demands upon it being very heavy, the trains were always late. St. Joseph being the most important distributing office in the West, an immense amount of mail arrived there every morning by the railway. The overland stages were scheduled to leave three hours after the train was due. All of this time was required for the distribution of the mail, so when the trains were late, the stages, which seem to have run with greater regularity than the trains, left with only a part or without any of the mail. An indefinite continuance of this state of affairs was not viewed with equanimity by Mr. William A. Davis, who had charge of the distribution of mail at St. Joseph.

What Mr. Davis Suggested.

The remedy proposed by Mr. Davis was to have the overland mail all ready for the stages when the train arrived. If this were done, the mail would not miss the stage, even though the train was full three hours late and the stage started promptly. To save this three hours he urged the postmaster at St. Joseph, and

through him the officials at Washington, to be allowed to meet the mail on its arrival at the eastern terminus of the railroad at West Quincy and separate the mail as the train proceeded on its journey across the State of Missouri. His requests were granted, and he seems to have lost no time in putting his plans into execution.

The First Railway Postoffice.

On August 5, 1862, he wrote the second assistant postmaster-general a brief account of his experiment. He said:

"One of the clerks and myself left here on Saturday, 26th, so as to be in Quincy on Monday, 28th ultimo, to commence the distribution of the overland mail on the Hannibal & Saint Joseph Railroad. Finding that the mail cars had not been arranged according to promise made . . . . . instead of going to Quincy I proceeded to Hannibal, and succeeded in getting cars temporarily fixed, in which (though with some inconvenience) I think the work can be done until the new cars are ready. The distribution was commenced on Monday at Palmyra, and I assisted the clerk, going up as far as Clarence, at which place I turned back with the clerk who had come down to go up on Tuesday; assisted up to the same point on Tuesday; turned back and distributed the mail going up on Wednesday myself. We have now got through with a week's service, and can confidently report that when the accommodations are finished that are promised by Mr. Hayward, superintendent of the road, the distribution can be done entirely to your satisfaction."

Improvements Under Supt. Bangs.

The next important advance in the railway mail service was made in 1875, and the credit for it belongs to Col. George S. Bangs, who was then superintendent.

Up to the time Mr. Bangs became general superintendent of the railway mail service, the officials of the Postoffice Department aimed no higher than to secure for the mail as great expedition as passengers could obtain for themselves. Mr. Bangs was not content with this program. He hoped to obtain greater dispatch for the mail. The mail business had always been looked upon as an adjunct of the passenger business. Mr. Bangs hoped to secure exclusive mail trains, the departure and arrival of which should be timed to suit the wants of the Postoffice Department.

First of Special Mail Trains.

In 1874 he presented his views to Postmaster-General Jewell, by whom they were favorably received, and he was authorized to open negotiations with the New York Central & Hudson River and the Lake Shore & Michigan Southern Railroads for a fast mail service between New York and Chicago.

It was the old story of making bricks without straw. The Postoffice Department had no appropriation to pay for such facilities, hence it had to depend at first on the public spirit of the railroad authorities. Commodore Vanderbilt, the president of the companies whose lines were to be used, had had dealings with the Department, and was perhaps not altogether sanguine as to the practical issue of the experiment, or in respect to the countenance it would receive from Congress; but Mr.

William H. Vanderbilt, the vice president, lent a willing ear to Mr. Bangs' proposition, and did his utmost to aid him in putting it into effect.

Commodore Vanderbilt a Prophet.

Colonel Bangs stipulated that if Mr. Vanderbilt would have twenty cars built and the service performed, all matter originating at, or coming into, the New York postoffice, which could reach its destination at the same time by this line, should be sent by this train, and that the railway companies could have the right to demand a weighing of the mail matter at will, all railroads being paid according to weight. When the details of the plan were communicated to Commodore Vanderbilt, he is reported to have said to his son, "If you want to do this, go ahead, but I know the Postoffice Department, and you will, too, within a year."

Fulfilment of the Prophecy.

Mr. Vanderbilt did go ahead. He constructed and equipped the finest mail train ever seen * * * ran it for ten months, never missed a connection at Chicago, and was always on time at New York. He did not have to wait a year, however, for a realization of the sagacious old Commodore's prophecy. Within three weeks, despite the indignant protest of Colonel Bangs, the mails of three States were ordered to be taken from this and given to another route. This was denounced as a gross and wanton breach of plighted faith, and its results were far-reaching and disastrous.

Mr. Vanderbilt Withdraws Train.

The Pennsylvania Railroad, not to be outdone by its rival, also established a fast mail service, and thus there was a double service between New York and Chicago, and the outlook was bright for even wider extensions of the fast mail service, when Congress, in spite of the efforts of the Postoffice Department, passed an act reducing by 10 per cent the compensation to the trunk lines for carrying mail. Very shortly after this act was passed the postmaster-general received a letter from W. H. Vanderbilt which, after reciting the conditions and circumstances under which the fast mail was inaugurated, closed as follows: "Congress, by its recent action, has expressed an unwillingness to provide suitable compensation for the service, and I am therefore obliged to notify you that the fast mail train between New York and Chicago will be discontinued on the roads I have the honor to represent, after Saturday, July 22, 1876."

Pennsylvania Road Abandons Service.

Mr. Thomas A. Scott, on behalf of the Pennsylvania Railroad Co., sent in a similar communication on July 15th. The Postoffice Department being unable to offer any relief, the fast mail service, which began so auspiciously on September 16, 1875, came to an end July 22, 1876. Colonel Bangs was greatly disappointed at this abrupt undoing of all his labors, and worn out by never-ending toil and disheartened by the action of Congress, he tendered his resignation and insisted on its acceptance.

Though then in operation less than ten months, the fast mail trains had been in existence long enough to establish themselves firmly in the esteem of the business world. They ran between New York and Chicago in twenty-six hours, making connections at all important junctions with trains to and from a vast territory, and thus advanced the mail by twelve, twenty-four, even forty-eight hours for some sections of the country. The fast mail on the New York Central and the Lake Shore never missed a single connection, and was late at Chicago only three times, and at New York just once.

Service Is Finally Restored.

As may be easily imagined, the discontinuance of this admirable service caused a great deal of dissatisfaction and unfavorable comment. In the following year an effort was made in Congress to restore the service, and an appropriation of $150,000 was secured on March 3, 1877. This money was to be paid for expedited service, and became known as "special facility pay." With this appropriation the department was enabled to restore the fast mail trains. In 1884 several more fast mail trains were secured in other parts of the country without the use of special funds, and since the latter year the service has been so widely extended that there is now scarcely an important mail route in the country that does not have at least one fast mail train leaving at the time and run at such speed as will best meet the needs of the Postoffice Department.

Modern Railway Mail Service.

From a place in which there was no separation of the mail, the car has become the place in which nearly the whole of the work of separation is performed. The mail is now sent from the stationary postoffices with the least possible separation. Broadly speaking, the mail is distributed for trains rather than for cities. This allows the mails to be kept open at the central office until almost train time, and greatly economizes both space and labor in the central office. The through mails, for the most part, do not even pass through the terminal postoffice. Unless the interval between their arrival and departure is a very long one, they are transferred directly from one station to another. Mr. E. L. West, one of the division superintendents of the railway mail service, says that not more than five per cent of the mail passing through Chicago is taken to the central office, the other 95 per cent being transferred directly from one train to another.

All In-Coming Mail Is Sorted.

Although the mail is always received from the city postoffices undistributed, it is never sent to them from the railway postoffices in this condition if this would involve any delay in ultimate delivery. On the arrival in Chicago of the morning mail trains the letter mail for the business portion of the city is ready for the carriers, and the letters for the remainder of the city are sorted and are ready to go at once to their respective stations. The postmaster-general recently said: "It is the intention eventually to absorb all the work of city

distribution into the railway mail service whenever the mails can be expedited thereby."

The ideal railway mail service of Colonel Bangs is now a reality. On nearly every railroad in the United States mail is the favored traffic. It goes on the fastest trains, and has the right of way; no mail is ever left behind, the railways always furnishing sufficient car space regardless of the suddenness of the demand that may be made; these cars are furnished with the best appliances that art and science afford; and the railroad employees give the mail their first attention on arrival of trains.

The gross revenue of the railroads of the United States from the transportation of the mails in 1915 approximated to sum of $55,000,000.

	DISTRICTS	ALL TRAINS					
		CARS AND CONTENTS		CONTENTS			
		Gross Tons One Mile	Average Tons per train	Net Tons One Mile	Average Tons per Train		
					This Week	Same week last year	Same week last month
1	NEBRASKA DIVISION.						
2	Council Bluffs-Grand Island,	22,104,216	1,744	10,216,578	807	452	558
3	Grand Island-North Platte,	20,859,713	1,879	10,141,462	913	578	632
4	Total Main Line	42,963,929	1,807	20,358,040	857	508	592
5	Branches South of Valley,	1,838,719	490	776,695	207	264	225
6	Branches North of Columbus,	636,169	329	181,729	94	140	98
7	Branches North of Gr'd Island,	383,993	221	89,235	51	70	52
8	Kearney Branch,	236,596	254	50,325	54	88	94
9	Total Branches,	3,095,477	371	1,097,984	131	183	145
10	TOTAL NEBRASKA DIVISION,	46,059,406	1,434	21,456,024	668		486
11	*Same Last Year*	55,676,999	1,014	24,688,974		450	
12	WYOMING DIVISION						
13	North Platte-Sidney.	17,328,794	2,011	8,817,520	1,023	698	674
14	Sidney-Cheyenne,	13,099,156	2,094	7,074,931	1,131	718	829
15	Cheyenne-Laramie,	9,287,318	1,575	4,753,292	806	680	707
16	Laramie-Rawlins,	16,934,404	1,491	8,751,076	771	563	731
17	Total Main Line,	56,649,672	1,764	29,396,819	916	655	729
18	North Platte Branch	77,350	328	18,422	78		102
19	TOTAL WYOMING DIVISION,	56,727,022	1,753	29,415,241	909		727
20	*Same Last Year,*	68,348,149	1,293	34,883,854		655	
21	UTAH DIVISION						
22	Rawlins-Green River,	19,333,731	1,560	9,899,542	799	475	694
23	Green River-Evanston,	10,288,244	1,309	4,578,048	582	409	520
24	Evanston-Ogden	6,625,543	1,681	2,938,822	746	568	586
25	Total Main Line	36,247,518	1,499	17,416,412	720	467	620
26	Superior Branch	163,060	1,274	90,196	705	284	643
27	Park City Branch.	68,264	132	28,638	55	172	75
28	Total Branches,	231,324	358	118,834	184	197	188
29	TOTAL UTAH DIVISION	36,478,842	1,469	17,535,246	706		611
30	*Same Last Year.*	50,875,091	962	24,539,693		464	
31	KANSAS DIVISION.						
32	Kansas City Junction City,	8,236,098	1,089	3,275,172	433	389	406
33	Junction City-Ellis,	5,942,151	928	2,424,955	379	341	407
34	Total Main Line	14,178,249	1,015	5,700,127	408	366	407
35	Leavenworth Branch,	56,776	119	18,671	39	46	52
36	Topeka Branch,	75,622	225	16,810	50	47	86
37	Manhattan Branch,	1,110,079	844	516,810	393	357	349
38	Junction City Branch,	312,384	237	83,205	64	84	64
39	Enterprise Branch,	1,832	92	297	15		40
40	Solomon Branch,	350,849	440	129,456	162	150	111
41	McPherson Branch,	106,139	217	27,904	57	74	62
42	Plainville Branch,	688,166	477	239,824	166	146	162
43	Total Branches,	2,701,847	436	1,032,977	167	191	163
44	TOTAL KANSAS DIVISION,	16,880,096	837	6,733,104	334		331
45	*Same Last Year,*	20,816,738	738	8,914,349		316	
46	COLORADO DIVISION.						
47	Ellis-Cheyenne-Wells.	3,936,672	746	1,668,105	316	297	298
48	Cheyenne Wells Denver,	4,693,244	816	2,136,255	371	390	373
49	Cheyenne-Denver,	4,826,050	1,131	2,408,081	565	520	487
50	Julesburg-Denver	4,149,176	1,038	1,531,215	383	373	307
51	Total Main Line,	17,605,142	912	7,743,656	401	393	363
52	Colby Branch,	256,227	300	78,293	92	80	95
53	Boulder Branch, (Inc. St Vrains Branch),	133,640	245	57,395	105	113	139
54	Total Branches,	389,867	279	135,688	97	87	112
55	TOTAL COLORADO DIVISION,	17,995,009	870	7,879,344	381		348
56	*Same Last Year.*	23,129,862	751	11,418,936		371	
57	TOTAL MAIN LINE.	167,644,510	1,479	80,615,054	712	505	576
58	TOTAL BRANCHES,	6,495,865	386	2,403,905	143	176	150
59	GRAND TOTAL.	174,140,375	1,337	83,018,959	638		526
60	*Same Last Year.*	219,346,839	997	104,445,806		475	

How Weekly Account of Tonnage Handled is Kept by Railroads.

How Comparative Accounts of Operations Are Kept on the Union Pacific and Oregon Short Line.

	UNION PACIFIC R. R.			OREGON SHORT LINE		
	MONTHS ENDING	MONTHS ENDING	% INC. OR DEC.	MONTHS ENDING	MONTHS ENDING	% INC. OR DEC.
AVERAGE MILES OPERATED						
GROSS EARNINGS						
OPERATING EXPENSES						
NET EARNINGS						
OPER. EXP.—MAINTENANCE OF WAY						
OPER. EXP.—MAINTENANCE OF EQUIPMENT						
OPER EXP.-TRAFFIC EXPENSES OPER. EXP.—CONDUCTING TRANSPORTATION						
OPER. EXP.—GENERAL EXPENSES						
RATIO EXPENSES TO EARNINGS						
FREIGHT TRAIN MILEAGE						
FREIGHT ENGINES PER TRAIN						
FREIGHT TON MILEAGE						
FREIGHT—¢ REV. TO GROSS TON MILEAGE*						
FREIGHT RATE—COMMERCIAL (CTS.)						
FREIGHT TRAFFIC UNBALANCED						
FREIGHT CAR MILES PER CAR PER DAY						
FREIGHT—TONS PER LOADED CAR						
FREIGHT—TONS PER TRAIN						
FREIGHT EARNINGS PER TRAIN MILE						
PASSENGER TRAIN MILES						
PASSENGER ENGINES PER TRAIN						
PASSENGER ONE MILE INC. SUBURBAN						
PASSENGER RATE (CTS.)						
PASSENGER AVERAGE NO. PER TRAIN						
PASSENGER EARNINGS PER TRAIN MILE						
MILEAGE AND PER DIEM BALANCE CAR ~~HIRE AND RENTAL OF EQUIPMENT~~						
MILES PER FREIGHT LOCOMOTIVE*						
GROSS TON MILES PER LB. COAL*						
GROSS EARNINGS—WATER LINES						
OPERATING EXPENSES—WATER LINES						
NET EARNINGS—WATER LINES						
LOSS AND DAMAGE - FREIGHT						

*FIGURES COVER GENL. MGR'S. DISTRICT

By this system it is easy to tell at a glance how the business of the roads compares for stated periods. It is a condensed history of the entire business, prepared from the extended reports of each department.

ITEM		UNION PACIFIC SYSTEM																	
		COUNCIL BLUFFS		OMAHA		GRAND ISLAND		CHEYENNE		GREEN RIVER		DENVER		KANSAS CITY		SALT LAKE		SPOKANE		PORTLAND	
		1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907
1	Number of freight cars originating at station, loaded by stationmen	1,613	1,471	1,501	1,508	637	539	469	475	36	33	1,025	1,119	1,232	1,287	1,004	1,063	276	292	801	687
2	Number of freight cars handled in station yard	21,907	26,204	35,466	38,386	31,237	29,323	31,854	30,038	30,336	26,079	27,018	24,692	23,911	26,696	16,808	21,898	2,825	3,430	13,790	17,041
3	Tons of freight loaded by stationmen into cars originating at station	28,727	31,424	8,035	9,379	2,133	1,752	5,207	4,109	938	724	8,907	12,153	9,598	11,739	8,533	8,972	1,601	2,102	9,737	10,743
4	Tons of freight loaded by stationmen into cars passing station			1,286	1,655	23	20			197	95										
5	Tons of freight unloaded by stationmen	26,750	30,302	4,381	6,766	1,743	1,461	5,018	4,051	271	300	7,645	10,314	4,731	6,963	6,728	7,566	1,069	1,540	9,408	14,625
6	Total tons of freight handled by stationmen	28,727	31,424	13,771	13,285	2,780	2,511	5,683	4,704	1,327	1,059	10,722	13,942	10,473	12,689	12,473	13,510	2,343	3,007	19,145	25,368
7	Total tons of freight handled by stationmen, shippers, etc	70,509	65,007	97,372	97,382	51,532	24,523	54,871	34,081	18,816	14,446	91,071	62,408	93,705	99,343	69,209	78,534	13,943	16,393	183,871	200,370
8	Average tons of freight loaded per car by stationmen into cars originating at station	17.8	22.9	5.4	6.2	4.9	4.9	11.3	8.7	26.1	21.9	8.7	10.9	7.8	9.1	7.8	8.4	6.0	7.2	12.2	12.1
9	AGENCY EXPENSES FOR FREIGHT SERVICE. Agents and clerks	3,972	5,126	3,749	4,069	2,114	2,130	1,685	1,914	1,432	2,496	4,282	4,480	4,347	4,503	3,052	3,354	1,676	2,383	5,068	6,797
10	(Dollars) Station Labor	3,382	5,033	3,777	5,098	523	465	1,081	995	358	189	2,542	5,808	3,504	4,021	3,250	4,270	1,050	1,398	7,800	12,544
11	" Total	7,554	10,159	7,526	9,167	2,637	3,604	2,766	2,909	1,780	2,685	6,824	8,288	7,851	8,526	6,302	7,824	2,726	5,781	12,868	19,341
12	Expenses Yardmen and Switchmen in Freight Service (dollars)	3,177	5,018	11,289	14,174	3,303	5,960	3,142	3,916	2,085	4,325	5,025	5,214	4,842	6,579	4,827	6,393	774	1,132	5,898	4,633
13	Total Agency and Yard Expenses for Freight Service (dollars)	10,731	15,777	18,815	23,341	6,000	8,964	5,908	6,825	3,865	7,010	11,849	13,502	12,693	15,105	11,129	16,217	3,500	6,913	16,766	23,974
14	Yard Expenses per freight car handled (dollars)	0 15	0.21	0.32	0.37	0.11	0.20	0.10	0.13	0.07	0.17	0.19	0.21	0.20	0.25	0.29	0.38	0.27	0.33	0.25	0.27
15	Cost of Agents and clerks per ton handled by stationmen (cents)	13.8	16.3	31.8	30.6	76.0	101.1	29.6	40.7	107.2	235.7	39.9	32.1	41.5	35.5	24.5	26.3	71.3	79.2	26.5	26.8
16	Cost of station labor per ton handled by stationmen (cents)	12.5	16.0	32.1	38.4	18.8	18.5	19.0	21.2	27.0	27.8	23.7	27.3	33.5	32.7	26.1	31.6	44.8	46.5	40.7	49.4
17	Miles run by switch locomotives	15,070	28,631	34,865	41,634	14,015	21,877	12,304	15,294	8,697	16,599	20,118	21,131	18,389	26,539	13,374	23,329	5,079	7,512	16,752	20,849
	NUMBER OF CARS INTERCHANGED WITH CONNECTIONS																				
18	Received from	8,824	11,721	9,176	6,595	825	671	320	562	3,964	4,515	4,384	4,326	6,281	7,288	1,986	2,089	1,278	1,635	2,809	2,925
19	Delivered to	8,696	10,745	8,557	6,304	835	779	378	363	3,310	5,945	4,988	4,348	5,945	6,611	2,466	3,058	1,311	1,432	2,780	3,154
20	Total	17,580	22,456	17,733	12,897	1,664	1,450	698	925	† 7,274	8,460	9,372	8,674	12,186	13,899	4,452	5,141	2,589	3,067	5,589	6,077

† These cars were interchanged between the U. P. R. R. and O. S. L. R. R. at Granger; the work in connection therewith is handled at Green River.

Comparative Statement of Operations at Important Freight Stations.

"This land is utterly worthless for any present purpose, not because it is not fertile, but from the fact that it is inaccessible, wanting all facilities for reaching a market. Now, by constructing this road through the prairie, through the center of the state of Illinois, you will bring millions of acres of land immediately into the market that will otherwise remain for years and years unsalable."—*The Hon. Henry Clay, urging the construction of the Illinois Central Railroad.*

CHAPTER XIV.

TRANSPORTATION BY EXPRESS.

While not directly controlled or managed by railroad or steamship companies, the express service is one of the most important features of modern transportation. It has increased in magnitude despite the wonderful improvements which have been made in the freight service, much of the latter being now better than the express of forty years ago. Instead of this improvement in the freight service having the effect of minimizing or retarding the express business, however, it has apparently exerted an entirely opposite influence.

First of Express Business.

William Harnden was the first person to engage in the express business in the United States. This was in 1839, when he established a regular service between New York and Boston. His agents traveled in the ordinary passenger cars, carrying with them packages of goods for which the shippers desired speedier and more certain transit than the pioneer freight service afforded.

Prior to this, conductors and baggage agents had carried a lot of packages on their trains, leaving them with station agents to be called for by the parties to whom they were addressed. It was an unorganized traffic, conducted solely as a matter of accommodation. There was no fixed schedule of charges, no receipts were given and, if a package were lost or stolen, the sender had no redress.

Organization of Big Companies.

Harnden inaugurated a systematic, regular service between New York and Boston, then between New York and Philadelphia, and finally to a few of the principal European ports. He had competitors almost from the start. In 1840 Alvin Adams invaded the New England field, and shortly afterwards Thompson & Co., Kinsley & Co., and several other concerns were also in the field.

In 1850 the American Express Company was founded by the consolidation of the Livingston and the Wells companies. In 1852 Wells, Fargo & Co. started an overland route to the Pacific coast, and in 1854 Harnden & Co., Adams & Co., Thompson & Co., and Kinsley & Co. united under the name of the Adams Express Company. It was in the same year—1854—that the United States Express Company came into existence, its field being in the central West.

Business Keeps on Growing.

These, with the National Express Company, founded in 1853, monopolized the express service of the country until 1879, when the Pacific Express Company invaded the Southwestern section. In 1886 the Southern Express Company was incorporated and took over the Southern States.

Since then, until the advent of the Parcel Post, there has been little change in the business, the companies yearly growing larger and stronger as the lines of railway on which they operate expand. As each company has exclusive contracts with the railroads over which

it operates, there is little or no chance for competition on way business, except as two lines of road may parallel one another. [See pages 185-186.]

Eight Large American Companies.

Ostensibly the express companies and those operating railway and steamship lines are separate and distinct organizations, but in many instances the same financial interests are prominent in both. This has worked to the benefit of the express companies by assuring permanency in their business relations with the transportation lines.

There are now eight companies engaged in the business of forwarding goods and valuables by express. They are the Adams, American, National, Northern, Western, Southern, Great Northern and Wells-Fargo. Each has its well-defined territory, and there is a concert of action among them which prevents harmful competition even at the big competitive points. Several companies, for instance, have entrance to New York over different lines of railroad, but the rate for shipping goods from a given point to New York is the same in all instances.

General Terms of Contract.

Contracts made between express companies and railroads (or steamship lines) stipulate that the express company is to have the exclusive right to handle all the express business conducted over the transportation line. In most instances the cars are furnished by the railroads, and in a few by the express companies, in which latter case there is a mileage allowance. The express

company collects and delivers, handles, loads and unloads all goods, and assumes all risk of loss or damage, except such as may be caused by the carelessness or negligence of the railroad.

The railroad hauls the express cars on its express, passenger or special trains, so as to assure a fair minimum rate of speed. In return for this service the express company pays the railroad from forty to fifty per cent. of the gross receipts, binding itself to make its rates from fifty to one hundred and fifty per cent. higher than would be charged by the railroad for transporting the same goods as freight.

Main Source of Revenue.

Express companies will accept anything, from a diamond to an elephant, for shipment, but as a general rule their business is largely confined to the transportation of packages. There are certain grades of goods in the handling of which speed is the main essential. The best average speed of fast freight trains is not over fifteen miles an hour, while express trains move at from thirty to forty miles. The shipper who is sending small quantities of goods and wants them to land at their destination as speedily as possible naturally forwards them by express, regardless of the increased charges.

John Brown, in Chicago, wants to send a suit of clothes to Thomas Jones, in New York, in a hurry. He delivers the package to an express company. Twenty-four hours later it is in New York, and within twenty-six hours it is delivered at Jones' address. Cost, 50 cents. If it was sent by freight, it would take the better part of a week, and then on arriving in New York

would remain in the freight house until Jones called for it.

Means of Transporting Valuables.

All shipments of actual money, both specie and currency, as well as of valuables like diamonds and jewelry, are made by express. The carriage charges are based on the value of the package as declared by the shipper, and in event of loss, settlement is made on the same basis.

The practice of undervaluing goods sent by express, so as to secure a low rate, is both dangerous and illegal. A certain broker once sent from New York to New Orleans a package which he declared contained $1,000 in currency, and paid for the carriage of $1,000. The money disappeared in transit, and the shipper brought suit against the express company for $20,000, the amount which he swore the package really contained. In this he was corroborated by the teller of the bank where he had obtained the money, and who was with him when it was delivered to the express company.

Charges Based on Risk Taken.

All the courts in succession ruled against the recovery by the broker of more than $1,000, on the ground that the responsibility of the express company was limited by the broker's original declaration, and that its charge was based on that declaration.

In fixing upon the charge for the transmission of valuables, the risk assumed by the company is a factor. All ordinary packages are presumed to have a value of not exceeding $50, and the schedule of carriage charges

is made upon this basis. Occasionally a shipper is really ignorant as to the value of his package, and in response to the inquiry of the receiving clerk, will say, "I don't know." In such case the receipt will be made out to read, "Value asked, but not given." If such a package is lost, the shipper is limited to the actual value of the contents, which must not exceed $50. If he had given the value at $100, he would have been charged more for the transportation of the package, and in event of loss the company would have been responsible up to $100, provided it could be shown that the contents were actually worth that amount.

Loss Limited to Actual Value.

But the mere fact that a shipper puts a fictitious value on a package and pays carriage charges on such fictitious value does not entitle him to recover in case of loss. He must prove beyond question that the package actually contained the amount of money or valuables as declared when the shipment was made. For the courts to hold otherwise would be to place a premium on rascality. Valuable packages are received only when sealed, and consequently the agents of the express company have no means of knowing what their contents are. In instances of this kind the receipts are marked "Said to contain ——."

A certain bank official, whom we will call B., was behind in his accounts, and in expressing $15,000 to another bank put up a dummy package, receiving from the express company a receipt reading, "Said to contain $15,000." The package was stolen en route by an express messenger, who buried it without opening

it. The shipper made demand for the money, and the express company was about to settle, when the messenger, who was under surveillance all the time, was detected in the act of unearthing his booty. When the package was opened it was found to contain nothing but newspaper cut to the size of bank notes. B. blew his brains out.

Why Courts Are Careful.

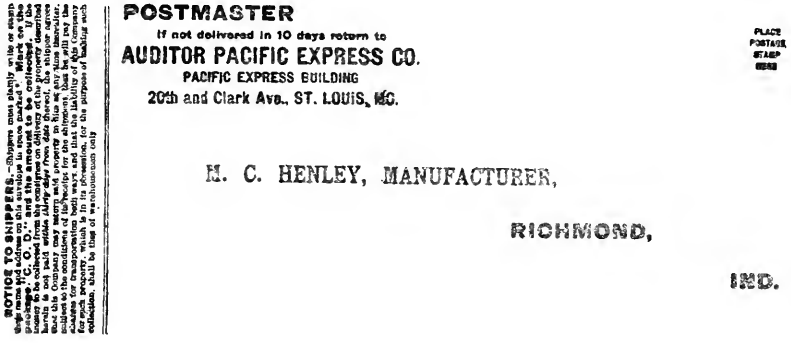
But suppose the messenger had not stolen the package en route, how would B. have benefited by his trickery? His plan evidently was to claim substitution of the bogus for the real package by somebody in the employ of the express company. If he could make it appear that he had sent $15,000 out of the bank, his accounts would be all right, and he was willing to put somebody else under suspicion to clear himself.

Tricks of this kind were not uncommon in the early days of the express business, and even up to the early 80's. It was the boldness with which some of them were worked that led to the "Said to contain" form of receipt, and also the practice of the courts in making it obligatory, in case of loss, for the shipper to prove the value of his shipment.

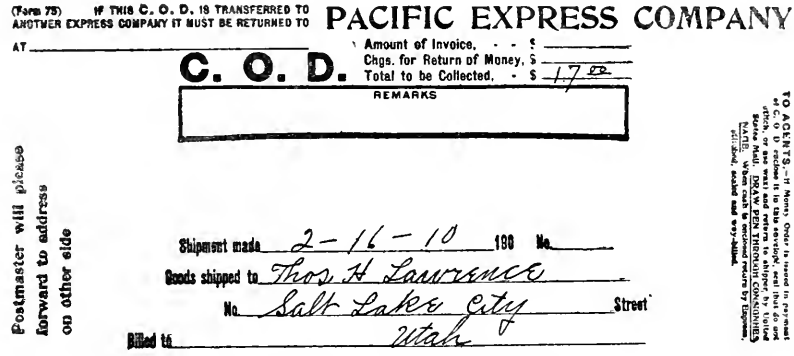
Importance of C. O. D. Business.

It is probably in the transaction of the C. O. D. or "Cash on delivery" business that the express service has its most important field. It used to be impossible to transact a C. O. D. trade without the express companies to act as trustees in forwarding the goods and collecting and returning the money to the shippers. There

are thousands of firms scattered all over the country which do business solely on this basis. One Chicago firm fills C. O. D. orders by express to the amount of $250,000 weekly. There are many other concerns in Chicago doing the same kind of business, and they thrive in every large city.



Face of C. O. D. Envelope.



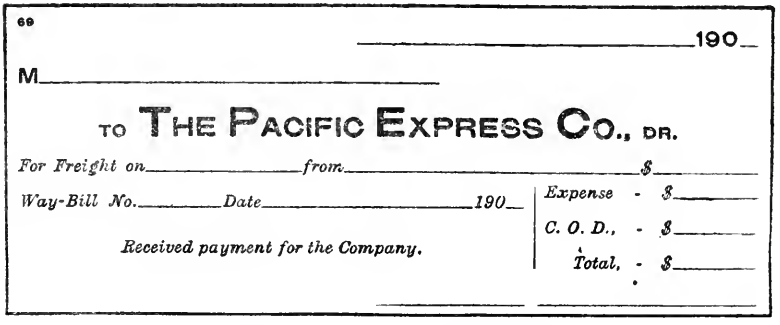
Reverse of C. O. D. Envelope.

If it were possible to abolish the express business, and the Parcel Post, the C. O. D. trade would die out, because there would be no means of establishing the

relationship of trustee between buyer and seller—somebody to act in the capacity of stakeholder, as it were.

How C. O. D. Plan Works.

The Banner Company, Chicago, advertise to sell a first-class watch for $10. Nels Nelson, living in Minnesota, wants the watch, but he doesn't know the Banner Company, and is averse to intrusting his $10 to stran-


No. _____ 190_

M_____

TO THE PACIFIC EXPRESS CO., DR.

For Freight on_____ from_____ $_____

Way-Bill No._____ Date_____ 190_

Received payment for the Company.

Expense - $_____

C. O. D., - $_____

Total, - $_____

Receipt for C. O. D. Shipment.

gers. The Banner Company, on the other hand, does not know Nelson and is not going to send the watch to him without good assurance that the money will be paid. What is done?

The Banner Company delivers the watch to the express company, addressed to Nelson at his Minnesota home, with a bill for $10. The watch is sent to the company's agent in the Minnesota town, who notifies Nelson of its receipt. Mr. Nelson goes to the express office, pays the $10, and gets the watch.

By this plan the seller does not trust the buyer; neither does the buyer trust the seller. There is no payment of money until the article ordered is actually

in the possession of the buyer. The money is then returned to the seller by the express company and the transaction is ended.

Profitable to Express Companies.

What does the express company get for this service? The charge for a double haul. Instead of getting paid for the carriage of the watch to destination only, as would be the case if the buyer had remitted in advance, it collects a second charge for the return of the money.

If the regular charge for the carriage of a watch from Chicago to Brainerd, Minn., is 25 cents, there would be a charge of 25 cents for the return of the money, thus virtually doubling the revenue of the express company from its C. O. D. business.

As a rule, the outward charge—that on the article itself—is paid by the seller, while the buyer pays for the return of the money. In a few instances, where the profit is large enough to admit of it, the seller pays both charges.

Business in Money Orders.

Issuance of money orders is another important item of express business. Owing to the well-known solvency of these companies, their orders pass current as cash in all parts of the country. If a man in St. Paul owes a bill of $5 in Boston, and has no bank account, he can buy an express order for the amount—it will cost him $5.05—and mail it to his creditor in Boston, who will receive it the same as cash.

According to government reports, the issue of money orders in one year recently numbered about 6,000,000,

while over 20,000,000 way-bills were issued for money shipments. The money value of these orders and way-bills it is impossible to obtain.

The total mileage covered by the express companies in the United States and Canada in the year 1914 was 305,690 miles, including 7680 miles of electric lines, 40,220 miles of steamboat lines, and 896 miles of stage lines. Since that time, however, the United States Express Company, operating over 30,938 miles of transportation lines, has retired from the business, owing to the competition of the Parcel Post, while the property of the National Express has been leased to the American Express Company.

The United States Parcel Post

With the inauguration in recent years of the United States Parcel post, which includes a collect-on-delivery service, the golden era of prosperity for most of the express companies passed into history. Those which remain in the business have been compelled to revise their rates in many cases, and to make a stronger appeal to the business community and the public at large, in the direction of more efficient as well as cheaper service, while observing greater economy in management in order to meet the new conditions of Government competition.

The domestic Parcel Post offers a convenient, quick, and efficient means of transporting mailable parcels to any postoffice in the United States or its possessions. The service reaches more places than any other transportation agency. Special treatment and advantages are accorded to shipments of farm products

weighing between 20 and 50 pounds. Low postage rates, based on the service rendered, are provided, on the zone system; the rates to nearby zones being particularly advantageous. Parcels may be insured against loss and may be sent C. O. D.

For Parcel Post purposes the United States is divided into units of area thirty minutes (30′) square. Such units form the basis of the eight postal zones. To ascertain in which zone a postoffice is located from the office of mailing, a Parcel Post Guide and map are jointly used. The guide applies to all offices, but a separate map is required for each unit. A zone key is furnished with the guide for use in the units of area in which some of the largest postoffices are located, and makes the map for those units unnecessary. Th e guide and maps are published by the Government, and may be purchased on application to the Third Assistant Postmaster-General, Washington, D. C.

Domestic Parcel Post mail is known as fourth-class matter and includes all farm and factory products (and books) not now embraced by law in either the first or second class or (with the exception of books) in the third class; not exceeding fifty pounds in weight when mailed for delivery within the first or second zones, nor exceeding twenty pounds in weight when mailed for delivery within any of the other zones; nor greater in size than 84 inches in length and girth combined, nor in form or kind likely to injure the person of any postal employee or to damage the mail equipment or other mail matter, and not of a character perishable within the period reasonably required for transportation and delivery.

CHAPTER XV.

RAILWAY CROP REPORT BUREAUS.

Every "granger" railroad gives a great deal of attention to crop reports, and maintains a well-organized bureau for their systematic collection. A "granger" road, be it understood, is one the bulk of traffic over which consists of agricultural products, and which operates in a strictly agricultural country. The Union Pacific, so far as its Nebraska, Wyoming, Kansas and Colorado divisions are concerned, is a "granger" road.

Keeping track of the crops is an important item in the operation of a railroad running through an agricultural district. It is a never-ending work. It begins with an estimate of the acreage to be tilled the coming season, and how it will be divided as regards the various crops. Then follows news as to seeding and planting, cultivation through the various stages, and at last the harvesting. Nor does this end it. When the crops are garnered reports must be made regularly as to the manner in which they are being moved to market, the amount left on hand, etc. And when this is completed, it is time to begin over again on another crop year.

System of Union Pacific Reports.

On the Union Pacific reports are made weekly by the various station agents—there are many hundreds of them—to the division superintendents. These officials in turn submit the reports to the general superintendent,

by whom they are turned over to the crop news bureau for compilation.

Let us assume that it is corn-planting time. The acreage has been previously estimated, but now the station agent knows exactly what acreage to report as being planted. His district is comparatively small and it is easy to ascertain just how much corn each farmer is "putting in." There are only ten large corn producers transacting business at this particular station, and the agent learns that between them they will plant 1,000 acres, as compared with 750 the preceding year. His report to division headquarters will read about as follows:

Miller's Corners, Neb.—Corn planting in full swing; weather favorable; ground in good condition owing to recent rains. Increase of 25 per cent in acreage over last year. Total, 1,000 acres.

Reports Cover Territory Thoroughly.

While the agent at Miller's Corners is collecting and forwarding this information, his brother agents on the same division are furnishing the division superintendent with similar reports. By the time all these reports are in, the division superintendent has an accurate, comprehensive idea as to crop conditions on his part of the road. From the mass of reports it is easy to prepare a general summary of each division about as follows:

Eighty-nine out of 100 stations on the Nebraska division of the Union Pacific report an average increase of 20 per cent in corn acreage planted. Crop generally in, and weather and soil conditions favorable. Six stations report same acreage as last year, and five

a decrease of 10 per cent, with weather and soil conditions adverse.

Meanwhile similar information is being secured and tabulated from all the divisions of the road running through agricultural territory, particular prominence being given to the crops of most importance in their respective localities.

Compilation of the Reports.

At general headquarters the various division reports are compiled and tabulated into one general report, covering the entire road. The crop report bureau is provided with blanks on which are spaces headed: Wheat, Corn, Oats, Rye, etc. There are also spaces headed Temperature and Rainfall. In these various spaces the net condition of each crop is entered by divisions. When filled out, the crop report blank looks about as follows:

Crop and Weather Report for Week Ending Thursday, September 24, 1915.

	Wheat	Corn	Rye	Barley	Temperature	Rainfall
						Inches
Neb. Div.....	+3%	+11%	—1%	—5%	60—88°	0—.50

This shows that the wheat condition is 3 per cent and corn 11 per cent better, while rye is 1 per cent and barley 5 per cent less than at the preceding report. The temperature for the week ranged from 60 to 88, while the rainfall was ½ inch.

Scope of the Reports.

Under the statistical report from each division there is a running comment as to general conditions prevailing on that particular division. A drouth, say, has retarded

crop progress on the Wyoming division. This would be noted as follows:

Drouth still general, though broken in a few places by slight showers. Planting is greatly delayed, and acreage will be largely curtailed.

These reports are made up with special reference to the crop season. If it is planting time, they refer chiefly to seeding and planting; at harvest time they give harvesting conditions, and at other seasons reports are made as to movement of crops to market, amount left in farmers' hands, etc. Every week, all through the busy part of the year, the station agents must keep headquarters advised as to crop conditions.

Purpose of Making Reports.

It is in the harvesting season that there is the greatest activity in collecting the reports. Railroads are vitally interested in knowing exact conditions, so cars may be placed at the points where most needed. The acreage reports at planting time give the railroad operators a fair idea as to whether new cars should be ordered; the harvest conditions show where they should be distributed.

When the planting reports show a large increase in acreage, with conditions favorable, the wise railway executive orders a lot of new cars, so as to be able to move the increased crop which, barring unusual contingencies, is sure to tax the capacity of the road at harvest time. By keeping in close touch with conditions throughout the growing season, railway men know to a certainty as the harvest approaches whether these

new cars will be needed and, if so, at what points on the road.

Condensed Into General Reports.

Crop reports on the Union Pacific system proper are collected by the Union Pacific, the Oregon Short Line and the Oregon Railway & Navigation Co. The information obtained along each division, after being tabulated for each division, is also summarized for the road in general. Thus, on the four agricultural divisions of the Union Pacific—Nebraska, Wyoming, Kansas and Colorado—there might be a wide variance in crop conditions. On one division these conditions might be favorable, on another the opposite. The crop report bureau experts strike an average so that the general condition, as well as the local conditions, existing over the entire road, may be ascertained. Both reports are essential. The operators of the road must know whether they need new cars; they must also know at what points on the road the traffic will be the heaviest.

Information In General Reports.

These general reports are made up as follows, and then signed by the director of maintenance and operation:

Union Pacific—Generally clear, warm weather favorable to rapid maturity of corn, which is being cut in some localities; practically no danger now from frost; at least average yield of good quality should be realized. Fall plowing in progress generally, except in some parts of Nebraska where soil needs rain. Good crop of sugar beets and potatoes being dug. Live stock in good con-

dition. Cars loaded on all divisions: Increase, merchandise, 15 per cent; miscellaneous, 168 per cent; decrease: wheat, 3 per cent; corn, 60 per cent; stock, 1 per cent; commercial coal, 63 per cent; interchange, 45 per cent. Freight traffic increased 6 per cent; passenger travel increased 4 per cent.

Oregon Short Line.—Weather cool, with heavy showers in some places. Soil in good condition for fall plowing; farmers sowing fall grain in some sections. Heavy shipments sugar beets to factories and fruit to market being made. Live stock and ranges in good condition. Mining industries continue fair; somewhat improved in Nevada. Coal mines still closed account miners' strike. Cars loaded on O. S. L.: Wheat, other grain, and hay, 358 cars, versus 260 same week last year; coal, 99 vs. 668. Freight traffic decreased 20 per cent; passenger travel increased slightly.

Oregon R. R. & N. Co.—Harvesting completed and farmers are hauling grain, picking fruit, and preparing for fall plowing; latter to begin when heavy rains improve soil conditions. Heavy increases in acreage fall grains expected this year to offset losses this season's spring grain crop, which was ruined by drought, but fall grain hardly affected. General rain needed to moisten soil. Cars loaded all divisions: Grain average—Hay 104, +4%; lumber 547, +6%; stock 165, +170%; coal 48, —32%; fruit 31, —34%; ore 78, —25%; merchandise 577, +24%; miscellaneous 1,025, +29%; total 3,233, +34%. Freight traffic increased 18%; passenger travel increased 15%.

Of Benefit to All Classes.

Reports of the same general nature, made by all railroads operating in agricultural territory, are of great value to the country generally. All classes of people profit by them. If crops in certain sections are good, the merchants solicit trade in those sections to the exclusion of others, knowing that the people will have money with which to supply their wants. Mill and factory owners watch the crop reports closely and govern their operations by them. There is no use in producing large stocks of goods unless there is money in the country to buy them, and hence every worker, every laborer, is dependent to a degree upon the crops for the permanency of his employment.

Compiled originally for the exclusive use of the railroads themselves, these crop reports now find a much wider use. They have become an important factor in all board of trade operations. Men buy and sell grain and other farm products on crop reports. Even such mammoth concerns as the United States Steel Corporation are affected by them—the better the crops the larger the demand for steel rails and cars, and the stronger the demand for steel products the more men can be employed, and the larger will be the profits made.

"I do not know how the railroad employes would like government ownership. I should think they would view such a suggestion with great alarm. I am unalterably opposed to it. It would place too vast a power in the control of the President. It would lead to a management of railroads not nearly so effective as that which we have under private ownership, and it would involve the government in an enormous debt. It would make railroad employes government servants and would subject them to the dangers of political supervision in a way that certainly would be most inimical to their interests. It would revolutionize the whole vast railroad system of the country."—*The Hon. William H. Taft, President of the United States.*

CHAPTER XVI.

FIXING VALUE OF RAILROADS.

It is not in the original cost of a railway, nor in the condition in which maintained, but in the extent to which it serves to effectuate interchanges that a railway has value. The value of a railway lies, then, not in its physical property, but in the use of that property. Value begins with use and increases as use increases.

"But the value of property results from the use to which it is put and varies with the profitableness of that use, present and prospective, actual and anticipated. There is no pecuniary value outside of that which results from such use." (C., C., C. & St. L. Ry. v. Backus, 154 U. S., 445)

The things that secure a broad, extensive and profitable use are, therefore, the things which give value to a railway. Among these are:

1. Location of the railway with reference to natural resources producing traffic.

If two men were each to start to construct a railway in a country devoid of transportation facilities, one or the other would, in the exercise of a superior judgment, so locate his railway as to obtain a more profitable traffic. This is an advantage of judgment which should apparently receive proper compensation.

Location of Route Important.

2.—Location of the route selected with reference to economical construction and service.

Almost any two communities which might exchange traffic are connected by several routes, but there is always one route over which the railway can be built most economically and perform the service at least cost. The route which is superior today may become inferior in the near future through the development of business to a volume which would warrant construction over a more costly route in order to obtain more economical operating conditions. The selection of the particular route which, while sufficiently adapted to the conditions of the time, also provides as far as may be for future growth, involves a very high type of business judgment and one which cannot be enlisted in the public service unless the opportunity for reward is left open. The most desirable route at any given time is that which gives the greatest traffic per dollar of necessary investment.

3.—Suitable construction and equipment.

Equipping the railway with such terminal facilities, passing tracks, rolling stock, and other appliances as are best adapted to the needs of the traffic.

4.—Such combination of capital and labor, and efficiency of management as will secure the maximum traffic per dollar of expenditure.

This involves good service, a fair wage, reasonable rates, and the maintenance of good relations with the investing public, employees, shippers and connecting lines. It is a combination of all these factors which secures the cheapest cost, the highest wages and the best profits.

Capital Needs Encouragement.

The question is, shall the railways be permitted that profit which is the ordinary reward of effective management, and hope of which is the only means of securing the greatest production per dollar expended, or shall they be limited to an investment return on the capital employed?

Capital cannot be interested in any undertaking if its maximum reward is limited to an investment return unless, at the same time, it is reasonably assured that it will not get less. Such an assurance cannot be had under the conditions at present surrounding railways.

While the existence of a railway renders the building of another in the same locality less probable, the possibility of rivalry grows as success becomes assured or increases. Previous occupancy gives no prescriptive right. This competition is not limited to a parallel line, but may be that of a line seeking to market the surplus products of a community not served by both. In either case the original line suffers a reduction in tonnage and a corresponding loss of revenue unless rates are increased. This loss may not only prevent any return to the investor, but may even cause insolvency. It will continue until traffic increases sufficiently to support both lines. In like manner competition may develop through the combination of two or more existing lines for through service, and with the same disastrous results to the investor in the original railway. Capital, therefore, incurs risks which must be compensated if additional capital is to be secured, either for the construction of new lines or the extension and betterment of those

already constructed—both of which are necessary to handle rapidly increasing traffic.

Must be Profit in Investment.

Further, unless there be a profit beyond the investment return, there is no reward for the conception of the undertaking, its economical construction, the subsequent additions of improved machinery and appliances, the introduction of economies of operation, nor the maintenance of harmonious relations with the public and connecting lines, all of which are necessary to secure the greatest amount of traffic per dollar expended.

No railway can be required to move any traffic at less than the cost of the service performed, plus a fair return on the fair value of that which is employed in rendering such service.

Thus, in approaching the question of valuation of railways, we must bear in mind that commerce cannot exist without transportation facilities; that adequate transportation facilities cannot be had unless capital is attracted, and unless sufficient inducements are offered to secure effective management.

What is Fair Valuation?

The following questions present themselves: Can a "fair valuation" be made? By what method should it be reached? For what practical purposes can it be used? By whom should it be undertaken?

Accurate nomenclature is the beginning of profitable discussion. No benefit will result from any argument unless the participants have a common understanding of the terminology employed. "Valuation" seems to

relate to "value," and a "railway valuation" would seem to be a process of ascertaining "railway value." Value, however, is a ratio in exchange; that is to say, in commerce. It is the relation which the law of supply and demand has, for the time being, established between one commodity and another. Value, then, is an incident of commerce, and cannot exist without it, and to qualify the term "value" by the word "commercial" is superfluous, for all value must be commercial. When it is proposed, therefore, to undertake something which is not to be a "commercial valuation," it is plain that the thing to be ascertained, whatever it may be, cannot be "value."

Through laying undue stress upon the present value of material in place, much confusion has arisen regarding the elements entering into value. This is caused largely by using the term "physical valuation" instead of "present cost of reproduction." This confusion has become so great that many regard the present value of material in place as constituting the only element in such value. Little attention has been given to value derived from use. It is unfortunate that so well-known a phrase as "cost of reproduction" should give place to one which is little understood and has already proved misleading.

Views of Federal Expert.

Census Bulletin No. 21 gave a commercial valuation of railway operated property in the U. S. a few years ago. In the introduction, Professor Henry C. Adams, Statistician of the Interstate Commerce Commission, stated that it was based on the two fundamental consid-

erations by which the market is influenced when property is bought or sold, namely, the expectation of income arising from its use and its strategic significance. Subsequently Professor Adams quoted the conclusions he had expressed in Census Bulletin No. 21, and urged an "inventory valuation," which he also called a "physical valuation."

That the Commission recognized a distinction between what has been erroneously termed "physical valuation" and what the courts have determined to be "fair value," is clearly indicated in their correspondence later with the Committee on Interstate Commerce of the United States Senate. A bill was then pending before the Committee directing the Commission to ascertain the "fair value" of railway property. They objected to the use of the term "fair value" and asked to have substituted a direction providing only for "cost of reproduction."

Opinion of Interstate Commerce Commission.

In its second annual report (1888) the Interstate Commerce Commission said:

The present value of a railroad property is necessarily very largely matter of opinion only; it depends upon a vast number of contingencies and uncertainties, a road apparently of great value today may soon become worthless by the opening of a competing line having superior advantages, or by the competitive struggles of other lines which operate to reduce the income of all; the value of a railroad largely results from the personal characteristics of its officials; the policy pursued by its directors, whether conservative and economical or aggressive and daring, is a great factor in the determination of the current value of the property; a

railroad property is not necessarily worth what it would cost to replace it, and, on the other hand, it may be worth very much more than that. (Page 64.)

thus admitting the existence of many elements other than "cost of reproduction" that enter into the "fair value" of a railway property.

In the case of Smyth v. Ames, 169 U. S. 466, the Supreme Court, while enumerating a number of items entering into the valuation of a railway, said:

We do not say that there may not be other matters to be regarded in estimating the value of the property.

In the case of the Chicago, etc., R. Co. v. Minnesota (134 U. S., 418), the Supreme Court emphasized the necessity of treating the railway company and the shipper with equal fairness.

Sweeping Decision by the Federal Courts.

In the case of Metropolitan Trust Company v. Houston & Texas Central Railway (being an appeal from rates established by the Commission based on "the estimated cost of reproduction of the road"), the court ruled that the Commission had under-estimated the value of the property, having made no allowance for its favorable location, and that:

In view of the advance in prosperity of the country through which it runs, and the increment to its value due to the settling, seasoning and permanent establishment of the railways, and to the established business and the good will connected with its business, which has been established through a long series of years, and all of which ought reasonably to be considered in fixing the value of the property and the capitalization upon which at least it is entitled to earn, and should pay, some returns by way of interest or dividends

. . .

In countries conditioned as Texas has been and is, such a railroad property and business cannot be reproduced, except substantially in the same manner in which this has been produced, that is, by a judicious selection of location, by small beginnings, and gradual advance through a number of years, more or less, of unproductive growth. The particular location of this road, of course, cannot be reproduced, and it cannot be appropriated by another private or *quasi* public corporation carrier by the exercise of the State's power of eminent domain. And even if the State should proceed to expropriate this property for the purpose of taking the same to itself for public use, the location of this road cannot be appropriated any more than any other property right of a natural person or of a corporation can be appropriated without just compensation. It is, therefore, not only impracticable, but impossible, to reproduce this road, in any just sense, or according to any fair definition of those terms. And a system of rates and charges that looks to a valuation fixed on so narrow a basis as that shown to have been adopted by the Commission, and so fixed as to return only a fair profit upon that valuation, and which permits no account for betterments made necessary by the growth of trade, seems to me to come clearly within the provision of the Fourteenth Amendment to the Constitution of the United States, which forbids that a State shall deprive any person of property without due process of law. . . . (90 Fed., 683, 688, 689.)

Thus the court not only clearly set forth that the estimated cost of reproduction of a road is inadequate as a basis of railway valuation, but itself suggested some of the other elements entering into such valuation.

As Defined by Taft.

In Judge Taft's letter accepting the nomination for the Presidency, he said:

It is clear that the physical value of the railroad and its plant is an element to be given weight in determining its full value; but the value of the railroad as a going concern, including its good will, due to efficiency of service and many other circumstances, may be much greater than the value of its tangible property, and it is the former that measures the investment on which a fair profit must be allowed. Then, too, the question what is a fair profit is one involving not only the rate of interest usually earned on normally safe investments, but also a sufficient allowance to make up for the risk of loss both of capital and interest in the original outlay. The question of rates and the treatment of railroads is one that has two sides. The shippers are certainly entitled to reasonable rates; but less is an injustice to the carriers. . . . The proper conclusion would seem to be that in attempting to determine whether the entire schedule of rates of a railroad is excessive, the physical valuation of the road is a relevant and important but not necessarily a controlling factor. . . .

Therefore, it would seem only wise and prudent to determine, before incurring the enormous expense incident to ascertaining the cost of reproduction, what relation, if any, it will have to the valuation of the railway, that is, to determine how such cost will be used in arriving at value. If it can be used, then consideration must be given to the elements that enter into the cost of reproduction. The plan now most generally advocated is that which has been followed by the several States that have undertaken a valuation of railways. Such valuations were undertaken originally for taxation purposes.

Things to Be Considered.

There are differences not only in the methods followed by the several States, but there are many items which,

as yet, have not entered into the valuation by any of the States and which should receive proper consideration. Among the items that have been ignored or inadequately treated are:

1—Cost of Surveys.

An expenditure of $250,000 for surveys in securing a low-grade line through the Allegheny or Rocky Mountains may save from five million to twenty-five million dollars in the ultimate cost of a reasonably low-grade line. This necessitates surveying many routes, only one of which will be used, yet all must enter into the original cost.

2—Rate of Interest During Construction.

The allowance of four per cent. is much below the ability of any new railway undertaking to secure capital. This rate can only be hoped for where new construction is undertaken by an existing line whose credit enables it to secure money at such a low rate.

3—Discount on Securities Sold.

Discount is a partial capitalization of commercial risk incurred, and it increases or decreases in proportion to the probable earning power. This practice is justified by long commercial usage, and has had judicial sanction. The only question is whether discount shall be capitalized and a reasonable return thereon allowed, or whether, during the time the securities are outstanding, the amount shall be charged proportionately each year against income. Taking, for example, $20,000,000 five per cent. bonds, maturing in fifteen years, selling at ninety, this would result in either:

(a) Adding to capital account, the annual interest charge may continue indefinitely to be 5 per cent. on $20,000,000, or $1,000,000.00

or

(b) Deducting this discount from income account, *pro rata*, during the fifteen years, the annual charge would be:

Annual interest charge (5 per cent.)	$1,000,000.00
Annual amount set aside for fifteen years to overcome discount (not compounded)	133,333.33
Total annual charge during each of the fifteen years	$1,133,333.33

The second plan reduces the ability to pay fair wages, to pay a fair return to capital or to lower rates during the twenty years.

Which plan is likely to secure the lower charge for services rendered? Which is the more likely to attract efficient labor or capital? If the sinking fund be not earned, can the deduction be made?

4—Cost of Material.

This must include the increased cost of placing material on the ground without railway facilities for transportation. It is a serious error to use a uniform price list for all materials. The source of supply must be considered.

5—Cost of Labor.

Labor in construction work is paid a much higher rate than other labor in the same community, owing to the temporary character of the service, and to the limited supply not meeting the increased demand produced by such extensive temporary work. Labor must be brought in from large labor centers. Boarding accommodations must be established and train service installed to transport men between their places of residence and their places of work.

6—Excavation and Embankments.

No uniform price of earth work can be used. It ignores the varying character of the soil and length of haul.

7—Contingencies and Contractor's Profit.

The ordinary allowance of 5 per cent. is too small. Usually the contractor allows not less than 10 per cent. profit for himself, in addition to an allowance for contingencies, and, then, his loss in one undertaking may wipe out his entire capital. For this reason some contracting firms organize a subsidiary corporation for each important piece of construction, thus limiting their liability. Banks, recognizing the great risk involved in contracting, are extremely careful in loaning money to such undertakings. Not only must the item of contingencies, therefore, be sufficiently large to guarantee the contractor against loss, but there must be some reasonable hope of profit for himself.

8—Effect of Machinery on Cost.

There have been many improvements in machinery and other appliances, which tend to reduce the cost of construction, since most of the railways were built; for example, rail-laying machines.

9—Carrying Charges.

Interest on investment and depreciation, if any, of plant prior to time it is placed on a self-sustaining basis. Texas makes this allowance in determining the cost price for the purpose of controlling the issue of capital securities. The Wisconsin Railroad Commission has admitted the right of the investor to capitalize such interest and depreciation.

10—Impact and Adaptation.

Although other States have not made this allowance, Minnesota has done so in its valuation for rate-making purposes.

11—Special Conditions Affecting Cost.

Additions and betterments made under traffic (and which were made for the purpose of increasing the capacity of the line) necessarily increases the cost of the work.

12—The Cost of Progress.

Railways, in their anxiety to render the most satisfactory and economical service, anticipate the future and substitute better facilities and better equipment before the old facilities and equipment actually require renewal or have become obsolete; also before the earnings from traffic would permit their writing off of the earlier appliances.

The following statement by the engineer who made the railroad appraisal in Minnesota is of especial interest at this point:

It is entirely tenable that the value of an economically constructed, judiciously financed and efficiently managed railway property, or the contra thereof, is not measured by its cost, and, for the instant, it seems necessary to recur to the elementary that cost and value are not synonymous and that the determination of the present value of the physical properties, using reproduction cost as a basis, bears no relation to value in the sense of utility, or as an investment.—(Page 31, Supplement to Annual Report of R. R. and Warehouse Commission, year ended Nov. 30, 1908.)

Problem of Relative Values.

What is the relative value of the physical property of a new railway and that of a railway say twenty-five years old, each having the same net returns from traffic, the one being a duplicate of the other? On this subject Mr. W. H. Williams, third vice-president of the Delaware & Hudson Company, says: "The right of way value would necessarily be the same, but the replacement value of material and equipment on the older railway would be only fifty per cent. of that of the new railway, plus such salvage value as material may have when retired from service. Assuming that, taking into consideration the changes in cost of labor and material entering into the construction, and the reduction in present market value of material on the older road due to wear and tear, the older road is valued at only ninety per cent. of that of the new railway, is the older railway to receive on its return from traffic only ninety per cent. of the return allowed to the new railway?"

Hard to Get Reliable Estimates.

The cost of reproduction is a matter of individual opinion. No engineer in estimating on the several important items of construction work for the year will come within ten per cent. of the total aggregate cost. Many of the more important items are frequently underestimated from twenty-five to fifty per cent. If experienced engineers, knowing the local conditions, cannot estimate the exact cost, how can those without special knowledge be expected to do so? A very good illustration of this may be had by contrasting the original estimates with the ultimate cost of postoffices and

other public buildings. An especially good illustration, and one known to all readers of the daily press, is that of the Panama Canal. The original estimate of the cost of engineering and construction work was $139,705,200, but a subsequent estimate was $297,766,000 (page 18, President's message to 61st Congress), and it is probable this cost will be greatly exceeded. In the case of the Panama Canal, large expenditures have been made for engineering in the selection of a route and to determine whether a water level or lock canal was the more desirable. These expenditures should be added to the cost, now (1916) figured at $375,000,000.

Policy of Railway Managers.

The policy of railway managements has been to make additions and betterments when the anticipated return was sufficient to pay the increased carrying charges, even if such return was not likely to be sufficient immediately to reimburse the stockholders for the old property withdrawn from service, the cost of which would not be reflected by any inventory valuation. Nor would that portion of the capital securities issued for material have its equivalent in an inventory valuation, which included the material at less than its cost price; that is, where an appraisal of property is taken before the property is placed on a self-sustaining basis—a difference which can properly be regarded as part of the cost of securing a going concern.

There are doubtless other elements affecting the relation between par value of securities outstanding and the "cost of reproduction." All of them should receive full consideration.

Wide Range in Valuation.

Professor Adams valued the Michigan Central Railroad twice, two years apart, and in the latter year increased the valuation to the extent of twenty million dollars by the simple device of a change of one per cent. in the interest rate assumed. Professor Adams valued the franchises at $18,259,880, while another economist of equal distinction—Professor E. R. Johnson of the University of Pennsylvania, and a former Isthmian Canal Commissioner—computed the value of the same franchises as $2,327,000. The methods used were identical except as to the interest rate assumed to be applicable. No one has yet suggested that the owners of the property would be justified in thus attempting to fool either themselves or the public.

Real Office of Money.

Money is only a medium of exchange. The investor is not interested in the money return from his investment, but in the result to be obtained with that money, *i. e.,* in its purchasing power. With wheat at fifty cents per bushel, the return on a $1,000 five per cent. bond, selling at par, would purchase one hundred bushels, while with wheat at one dollar per bushel, it would only purchase fifty bushels. With the cost of living continually advancing, the proposed limiting of income from investments in railroads must necessarily result in increased burdens upon those dependent entirely upon such income for support. It must make new investment in these securities unattractive so long as capital in other branches of commerce is permitted greater returns with equal or less risk.

The real situation now confronting the country was set forth in the reports of the Interstate Commerce Commission written several years ago, in which they called attention to the fact "that the facilities of the carriers have not kept pace with the commercial growth of the country."

Railways Favor Fair Valuation.

It should not be inferred that the railways object to having a valuation placed upon their properties. In effect such valuations are daily attempted with greater or less success by subscribers to new issues of securities and even by those who invest largely in securities heretofore issued. There is, however, serious objection to an incomplete and misleading valuation bearing the stamp and carrying the weight of governmental sanction, which can be of no practical advantage to the government, the public, or the railways, but may easily injure the public and the railways by disturbing the confidence of the former and hampering the activities of the latter.

When, on March 1, 1913, the President of the United States signed a bill directing the Interstate Commerce Commission to make a "Valuation of the Railways," the end which it was intended to serve was not specified in the bill. There was a feeling on the part of many, however, that the railways are over-capitalized—and that they endeavor to keep their rates up to a level that will produce revenue sufficient to pay a return on the excess of capitalization.

"Whatever affects the transportation facilities of the Central West touches its economic life at the very center."—*The Government Report on Isthmian Canal.*

"The question of transportation is the most important one before the civilized world. The nation which solves it quickest is bound to win in the race for commercial supremacy."—*Hon. J. E. Ransdell, Member of House Committee on Rivers and Harbors.*

INTERSTATE COMMERCE

"If any of the employes of our railroads want to try the experiment of government ownership and operation, let them enlist for three years in the Regular Army. Their experience in that service will not differ materially from their experience in any subordinate position on a government owned and operated railroad."—*Peter M. Arthur (now dead), former Grand Chief of the Brotherhood of Locomotive Engineers.*

CHAPTER XVII.

INTERSTATE COMMERCE ACT.

Following is the complete text of the act creating the Inter State Commerce Commission and defining the conditions upon which corporations may engage in the transportation of passengers, goods, etc., between the various States:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of this act shall apply to any common carrier or carriers engaged in the transportation of passengers or property wholly by railroad, or partly by railroad and partly by water when both are used, under a common control, management, or arrangement, for a continuous carriage or shipment, from one State or Territory of the United States, or the District of Columbia, to any other State or Territory of the United States or the District of Columbia, or from any place in the United States to an adjacent foreign country, or from any place in the United States through a foreign country to any other place in the United States, and also to the transportation in like manner of property shipped from any place in the United States to a foreign country and carried from such place to a port of transshipment, or shipped from a foreign country to any place in the United States and carried to such place from a port of entry either in the United States or an adjacent foreign country:

Provided, however, That the provisions of this act shall not apply to the transportation of passengers or property, or to the receiving, delivering, storage, or handling of property, wholly within one State, and not shipped to or from a foreign country, from or to any State or Territory as aforesaid.

The term "railroad" as used in this act shall include all bridges and ferries used or operated in connection with any railroad, and also all the road in use by any corporation operating a railroad, whether owned or operated under a contract, agreement, or lease; and the term "transportation" shall include all instrumentalities of shipment or carriage.

Charges Must Be Reasonable.

SEC. 1.—All charges made for any service rendered or to be rendered in the transportation of passengers or property as aforesaid, or in connection therewith, or for the receiving, delivering, storage, or handling of such property, shall be reasonable and just; and every unjust and unreasonable charge for such service is prohibited and declared to be unlawful.

SEC. 2.—That if any common carrier subject to the provisions of this act shall, directly or indirectly, by any special rate, rebate, drawback, or other device, charge, demand, collect, or receive from any person or persons a greater or less compensation for any service rendered, or to be rendered, in the transportation of passengers or property, subject to the provisions of this act, than it charges, demands, collects, or receives from any other person or persons for doing for him or them a like and contemporaneous service in the transportation of a like

kind of traffic under substantially similar circumstances and conditions, such common carrier shall be deemed guilty of unjust discrimination, which is hereby prohibited and declared to be unlawful.

SEC. 3.—That it shall be unlawful for any common carrier subject to the provisions of this act to make or give any undue or unreasonable preference or advantage to any particular person, company, firm, corporation, or locality, or any particular description of traffic, in any respect whatsoever, or to subject any particular person, company, firm, corporation, or locality, or any particular description of traffic, to any undue or unreasonable prejudice or disadvantage in any respect whatsoever.

Every common carrier subject to the provisions of this act shall, according to their respective powers, afford all reasonable, proper, and equal facilities for the interchange of traffic between their respective lines, and for the receiving, forwarding, and delivering of passengers and property to and from their several lines and those connecting therewith, and shall not discriminate in their rates and charges between such connecting lines; but this shall not be construed as requiring any such common carrier to give the use of its tracks or terminal facilities to another carrier engaged in like business.

Long and Short Haul.

SEC. 4.—That it shall be unlawful for any common carrier subject to the provisions of this act to charge or receive any greater compensation in the aggregate for the transportation of passengers or of like kind of property, under substantially similar circumstances and con-

ditions, for a shorter than for a longer distance over the same line, in the same direction, the shorter being included within the longer distance; but this shall not be construed as authorizing any common carrier within the terms of this act to charge and receive as great compensation for a shorter as for a longer distance:

Provided, however, That upon application to the Commission appointed under the provisions of this act, such common carrier may, in special cases, after investigation by the Commission, be authorized to charge less for longer than for shorter distances for the transportation of passengers or property; and the Commission may from time to time prescribe the extent to which such designated common carrier may be relieved from the operation of this section of this act.

SEC. 5.—That it shall be unlawful for any common carrier, subject to the provisions of this act to enter into any contract, agreement, or combination with any other common carrier or carriers for the pooling of freights of different and competing railroads, or to divide between them the aggregate or net proceeds of the earnings of such railroads, or any portion thereof; and in any case of an agrement for the pooling of freights as aforesaid, each day of its continuance shall be deemed a separate offense.

Publication of Schedules.

SEC. 6.—*(As amended March 2, 1889.)*—That every common carrier subject to the provisions of this act shall print and keep open to public inspection schedules showing the rates and fares and charges for the transportation of passengers and property which any such

common carrier has established, and which are in force at the time upon its route. The schedules printed as aforesaid by any such common carrier shall plainly state the places upon its railroad between which property and passengers will be carried, and shall contain the classification of freight in force, and shall also state separately the terminal charges and any rules or regulations which in any wise change, affect, or determine any part or the aggregate of such aforesaid rates and fares and charges. Such schedules shall be plainly printed in large type, and copies for the use of the public shall be posted in two public and conspicuous places, in every depot, station, or office of such carrier where passengers or freight, respectively, are received for transportation, in such form that they shall be accessible to the public and can be conveniently inspected.

Any common carrier subject to the provisions of this act, receiving freight in the United States to be carried through a foreign country to any place in the United States shall also in like manner print and keep open to public inspection, at every depot or office where such freight is received for shipment, schedules showing the through rates established and charged by such common carrier to all points in the United States beyond the foreign country to which it accepts freight for shipment; and any freight shipped from the United States through a foreign country into the United States, the through rate on which shall not have been made public as required by this act, shall, before it is admitted into the United States from said foreign country, be subject to customs duties as if said freight were of foreign produc-

tion; and any law in conflict with this section is hereby repealed.

No advance shall be made in the rates, fares and charges which have been established and published as aforesaid by any common carrier in compliance with the requirements of this section, except after ten days' public notice, which shall plainly state the changes proposed to be made in the schedule then in force, and the time when the increased rates, fares, or charges will go into effect; and the proposed changes shall be shown by printing new schedules, or shall be plainly indicated upon the schedules in force at the time and kept open to public inspection. Reductions in such published rates, fares, or charges shall only be made after three days' previous public notice, to be given in the same manner that notice of an advance in rates must be given.

And when any such common carrier shall have established and published its rates, fares and charges in compliance with the provisions of this section, it shall be unlawful for such common carrier to charge, demand, collect, or receive from any person or persons a greater or less compensation for the transportation of passengers or property, or for any services in connection therewith, than is specified in such published schedule of rates, fares, and charges as may at the time be in force.

Changes Must be Announced.

Every common carrier subject to the provisions of this act shall file with the Commission hereinafter provided for copies of its schedules of rates, fares, and charges which have been established and published in compliance with the requirements of this section, and

shall promptly notify said Commission of all changes made in the same. Every such common carrier shall also file with said Commission copies of all contracts, agreements, or arrangements with other common carriers in relation to any traffic affected by the provisions of this act to which it may be a party. And in cases where passengers and freight pass over continuous lines or routes operated by more than one common carrier, and the several common carriers operating such lines or routes establish joint tariffs of rates or fares or charges for such continuous lines or routes, copies of such joint tariffs shall also, in like manner, be filed with said Commission. Such joint rates, fares, and charges on such continuous lines so filed as aforesaid shall be made public by such common carriers when directed by said Commission, in so far as may, in the judgment of the Commission, be deemed practicable; and said Commission shall from time to time prescribe the measure of publicity which shall be given to such rates, fares, and charges, or to such part of them as it may deem it practicable for such common carriers to publish, and the places in which they shall be published.

No advance shall be made in joint rates, fares, and charges, shown upon joint tariffs, except after ten days' notice to the Commission, which shall plainly state the changes proposed to be made in the schedule then in force, and the time when the increased rates, fares, or charges will go into effect. No reduction shall be made in joint rates, fares, and charges, except after three days' notice, to be given to the Commission as is above provided in the case of an advance of joint rates. The Commission may make public such proposed advances,

or such reductions, in such manner as may, in its judgment, be deemed practicable, and may prescribe from time to time the measure of publicity which common carriers shall give to advances or reductions in joint tariffs.

Must Adhere to Schedules.

It shall be unlawful for any common carrier, party to any joint tariff, to charge, demand, collect, or receive from any person or persons a greater or less compensation for the transportation of persons or property, or for any services in connection therewith, between any points as to which a joint rate, fare, or charge is named thereon than is specified in the schedule filed with the Commission in force at the time.

The Commission may determine and prescribe the form in which the schedules required by this section to be kept open to public inspection shall be prepared and arranged, and may change the form from time to time as shall be found expedient.

If any such common carrier shall neglect or refuse to file or publish its schedules or tariffs of rates, fares, and charges as provided in this section, or any part of the same, such common carrier shall, in addition to other penalties herein prescribed, be subject to a writ of mandamus, to be issued by any circuit court of the United States in the judicial district wherein the principal office of said common carrier is situated, or wherein such offense may be committed, and if such common carrier be a foreign corporation in the judicial circuit wherein such common carrier accepts traffic and has an agent to perform such service, to compel compliance with the afore-

said provisions of this section; and such writ shall issue in the name of the people of the United States, at the relation of the Commissioners appointed under the provisions of this act; and the failure to comply with its requirements shall be punishable as and for a contempt; and the said Commissioners, as complainants, may also apply, in any such circuit court of the United States, for a writ of injunction against such common carrier, to restrain such common carrier from receiving or transporting property among the several States and Territories of the United States, or between the United States and adjacent foreign countries, or between points of transshipment and of entry and the several States and Territories of the United States, as mentioned in the first section of this act, until such common carrier shall have complied with the aforesaid provisions of this section of this act.

Continuous Shipment Demanded.

SEC. 7—That it shall be unlawful for any common carrier subject to the provisions of this act to enter into any combination, contract, or agreement, expressed or implied, to prevent, by change of time schedule, carriage in different cars, or by other means or devices, the carriage of freights from being continuous from the place of shipment to the place of destination; and no break of bulk, stoppage, or interruption made by such common carrier shall prevent the carriage of freights from being and being treated as one continuous carriage from the place of shipment to the place of destination, unless such break, stoppage, or interruption was made in good faith for some necessary purpose, and without any in-

tent to avoid or unnecessarily interrupt such continuous carriage or to evade any of the provisions of this act.

Carriers Liable for Damages.

SEC. 8.—That in case any common carrier subject to the provisions of this act shall do, cause to be done, or permit to be done any act, matter, or thing in this act prohibited or declared to be unlawful, or shall omit to do any act, matter, or thing in this act required to be done, such common carrier shall be liable to the person or persons injured thereby for the full amount of damages sustained in consequence of any such violation of the provisions of this act, together with a reasonable counsel or attorney's fee, to be fixed by the court in every case of recovery, which attorney's fee shall be taxed and collected as part of the costs in the case.

Two Courses in Damage Actions.

SEC. 9.—That any person or persons claiming to be damaged by any common carrier subject to the provisions of this act may either make complaint to the Commission as hereinafter provided for, or may bring suit in his or their own behalf for the recovery of the damages for which such common carrier may be liable under the provisions of this act, in any district or circuit court of the United States of competent jurisdiction; but such person or persons shall not have the right to pursue both of said remedies, and must in each case elect which one of the two methods of procedure herein provided for he or they will adopt. In any such action brought for the recovery of damages the court before which the same shall be pending may compel any director, officer, re-

ceiver, trustee, or agent of the corporation or company defendant in such suit to attend, appear, and testify in such case, and may compel the production of the books and papers of such corporation or company party to any such suit; the claim that any such testimony or evidence may tend to criminate the person giving such evidence shall not excuse such witness from testifying, but such evidence or testimony shall not be used against such person on the trial of any criminal proceeding.

Punishment for Offenders.

SEC. 10.—*(As amended March 2, 1899.)*—That any common carrier subject to the provisions of this act, or whenever such common carrier is a corporation, any director or officer thereof, or any receiver, trustee, lessee, agent, or person, acting for or employed by such corporation, who, alone or with any other corporation, company, person, or party, shall willfully do or cause to be done, or shall willingly suffer or permit to be done, any act, matter, or thing in this act prohibited or declared to be unlawful, or who shall aid or abet therein, or shall willfully omit or fail to do any act, matter, or thing in this act required to be done, or shall cause or willingly suffer or permit any act, matter, or thing so directed or required by this act to be done not to be so done, or shall aid or abet any such omission or failure, or shall be guilty of any infraction of this act, or shall aid or abet therein, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof in any district court of the United States within the jurisdiction of which such offense was committed, be subject to a fine of not to exceed $5,000 for each offense: *Provided,*

That if the offense for which any person shall be convicted as aforesaid shall be an unlawful discrimination in rates, fares, or charges, for the transportation of passengers or property, such person shall, in addition to the fine hereinbefore provided for, be liable to imprisonment in the penitentiary for a term of not exceeding two years, or both such fine and imprisonment, in the discretion of the court.

Any common carrier subject to the provisions of this act, or, whenever such common carrier is a corporation, any officer or agent thereof, or any person acting for or employed by such corporation, who, by means of false billing, false classification, false weighing, or false report of weight, or by any other device or means, shall knowingly and willfully assist, or shall willingly suffer or permit, any person or persons to obtain transportation for property at less than the regular rates then established and in force on the line of transportation of such common carrier, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof in any court of the United States of competent jurisdiction within the district in which such offense was committed, be subject to a fine of not exceeding $5,000, or imprisonment in the penitentiary for a term of not exceeding two years, or both, in the discretion of the court, for each offense.

Shippers Are Also Liable.

Any person and any officer or agent of any corporation or company who shall deliver property for transportation to any common carrier, subject to the provisions of this act, or for whom as consignor or consignee any such carrier shall transport property, who shall knowingly and willfully, by false billing, false classifica-

tion, false weighing, false representation of the contents of the package, or false report of weight, or by any other device or means, whether with or without the consent or connivance of the carrier, its agent or agents, obtain transportation for such property at less than the regular rates then established and in force on the line of transportation, shall be deemed guilty of fraud, which is hereby declared to be a misdemeanor, and shall, upon conviction thereof in any court of the United States of competent jurisdiction within the district in which such offense was committed, be subject for each offense to a fine of not exceeding $5,000 or imprisonment in the penitentiary for a term of not exceeding two years, or both, in the discretion of the court.

Punishment for Bribers.

If any such person, or any officer or agent of any such corporation or company, shall, by payment of money or other thing of value, solicitation, or otherwise, induce any common carrier subject to the provisions of this act, or any of its officers or agents, to discriminate unjustly in his, its, or their favor as against any other consignor or consignee in the transportation of property, or shall aid or abet any common carrier in any such unjust discrimination, such person or such officer or agent of such corporation or company shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof in any court of the United States of competent jurisdiction within the district in which such offense was committed, be subject to a fine of not exceeding $5,000, or imprisonment in the penitentiary for a term of not exceeding two years, or both, in the discretion of the court, for

each offense; and such person, corporation, or company shall also, together with said common carrier, be liable, jointly or severally, in an action on the case to be brought by any consignor or consignee discriminated against in any court of the United States of competent jurisdiction for all damages caused by or resulting therefrom.

Creation of Commission.

SEC. 11.—That a Commission is hereby created and established to be known as the Inter-State Commerce Commission, which shall be composed of five Commissioners, who shall be appointed by the President, by and with the advice and consent of the Senate. The Commissioners first appointed under this act shall continue in office for the term of two, three, four, five, and six years, respectively, from the first day of January, anno Domini eighteen hundred and eighty-seven, the term of each to be designated by the President; but their successors shall be appointed for terms of seven years, except that any person chosen to fill a vacancy shall be appointed only for the unexpired time of the Commissioner whom he shall succeed. Any Commissioner may be removed by the President for inefficiency, neglect of duty, or malfeasance in office. Not more than three of the Commissioners shall be appointed from the same political party. No person in the employ of or holding any official relation to any common carrier subject to the provisions of this act, or owning stock or bonds thereof, or who is in any manner pecuniarily interested therein, shall enter upon the duties of or hold such office. Said Commissioners shall not engage in any other busi-

ness, vocation, or employment. No vacancy in the Commission shall impair the right of the remaining Commissioners to exercise all the powers of the Commission.

Authority of the Commission.

SEC. 12.—*(As amended March 2, 1889, and February 10, 1891.)*—That the Commission hereby created shall have authority to inquire into the management of the business of all common carriers subject to the provisions of this act, and shall keep itself informed as to the manner and method in which the same is conducted, and shall have the right to obtain from such common carriers full and complete information necessary to enable the Commission to perform the duties and carry out the objects for which it was created; and the Commission is hereby authorized and required to execute and enforce the provisions of this act; and upon the request of the Commission, it shall be the duty of any district attorney of the United States to whom the Commission may apply to institute in the proper court and to prosecute under the direction of the Attorney-General of the United States all necesssary proceedings for the enforcement of the provisions of this act and for the punishment of all violations thereof, and the costs and expenses of such prosecution shall be paid out of the appropriation for the expenses of the courts of the United States; and for the purposes of this act the Commission shall have power to require, by subpœna, the attendance and testimony of witnesses and the production of all books, papers, tariffs, contracts, agreements, and documents relating to any matter under investigation.

Compulsory Attendance of Witnesses.

Such attendance of witnesses, and the production of such documentary evidence, may be required from any place in the United States, at any designated place of hearing. And in case of disobedience to a subpœna the Commission, or any party to a proceeding before the Commission, may invoke the aid of any court of the United States in requiring the attendance and testimony of witnesses and the production of books, papers, and documents under the provisions of this section.

And any of the circuit courts of the United States within the jurisdiction of which such inquiry is carried on may, in case of contumacy or refusal to obey a subpœna issued to any common carrier subject to the provisions of this act, or other person, issue an order requiring such common carrier or other person to appear before said Commission (and produce books and papers if so ordered) and give evidence touching the matter in question; and any failure to obey such order of the court may be punished by such court as a contempt thereof. The claim that any such testimony or evidence may tend to criminate the person giving such evidence shall not excuse such witness from testifying; but such evidence or testimony shall not be used against such person on the trial of any criminal proceeding.

Taking of Depositions.

The testimony of any witness may be taken, at the instance of a party in any proceeding or investigation pending before the Commission, by deposition, at any time after a cause or proceeding is at issue on petition and answer. The Commission may also order testimony

to be taken by deposition in any proceeding or investigation pending before it, at any stage of such proceeding or investigation. Such depositions may be taken before any judge of any court of the United States, or any commissioner of a circuit, or any clerk of a district or circuit court, or any chancellor, justice, or judge of a supreme or superior court, mayor or chief magistrate of a city, judge of a county court, or court of common pleas of any of the United States, or any notary public, not being of counsel or attorney to either of the parties, not interested in the event of the proceeding or investigation. Reasonable notice must first be given in writing by the party or his attorney proposing to take such deposition to the opposite party or his attorney of record, as either may be nearest, which notice shall state the name of the witness and the time and place of the taking of his deposition. Any person may be compelled to appear and depose, and to produce documentary evidence, in the same manner as witnesses may be compelled to appear and testify and produce documentary evidence before the Commission as hereinbefore provided.

Every person deposing as herein provided shall be cautioned and sworn (or affirm, if he so request) to testify the whole truth, and shall be carefully examined. His testimony shall be reduced to writing by the magistrate taking the deposition, or under his direction, and shall, after it has been reduced to writing, be subscribed by the deponent.

If a witness whose testimony may be desired to be taken by deposition be in a foreign country, the deposition may be taken before an officer or person designated by the Commission, or agreed upon by the parties by

stipulation in writing to be filed with the Commission. All depositions must be promptly filed with the Commission.

Witnesses whose depositions are taken pursuant to this act, and the magistrate or other officer taking the same, shall severally be entitled to the same fees as are paid for like services in the courts of the United States.

Notification to Offenders.

SEC. 13. That any person, firm, corporation, or association, or any mercantile, agricultural, or manufacturing society, or any body politic or municipal organization complaining of anything done or omitted to be done by any common carrier subject to the provisions of this act in contravention of the provisions thereof, may apply to said Commission by petition, which shall briefly state the facts; whereupon a statement of the charges thus made shall be forwarded by the Commission to such common carrier, who shall be called upon to satisfy the complaint or to answer the same in writing within a reasonable time, to be specified by the Commission. If such common carrier, within the time specified, shall make reparation for the injury alleged to have been done, said carrier shall be relieved of liability to the complainant only for the particular violation of law thus complained of. If such carrier shall not satisfy the complaint within the time specified, or there shall appear to be any reasonable ground for investigating said complaint, it shall be the duty of the Commission to investigate the matters complained of in such manner and by such means as it shall deem proper.

Said Commission shall in like manner investigate any

complaint forwarded by the railroad commissioner or railroad commission of any State or Territory, at the request of such commissioner or commission, and may institute any inquiry on its own motion in the same manner and to the same effect as though complaint had been made.

No complaint shall at any time be dismissed because of the absence of direct damage to the complainant.

Reports Are Legal Evidence.

SEC. 14. (*As amended March 2, 1889.*) That whenever an investigation shall be made by said Commission, it shall be its duty to make a report in writing in respect thereto, which shall include the findings of fact upon which the conclusions of the Commission are based, together with its recommendation as to what reparation, if any, should be made by the common carrier to any party or parties who may be found to have been injured; and such findings so made shall thereafter, in all judicial proceedings, be deemed prima facie evidence as to each and every fact found.

All reports of investigations made by the Commission shall be entered of record, and a copy thereof shall be furnished to the party who may have complained, and to any common carrier that may have been complained of.

The Commission may provide for the publication of its reports and decisions in such form and manner as may be best adapted for public information and use, and such authorized publications shall be competent evidence of the reports and decisions of the Commission therein contained, in all courts of the United States, and of the

several States, without any further proof or authentication thereof. The Commission may also cause to be printed for early distribution its annual reports.

Provisions for Reparation.

SEC. 15. That if in any case in which an investigation shall be made by said Commission it shall be made to appear to the satisfaction of the Commission, either by the testimony of witnesses or other evidence, that anything has been done or omitted to be done in violation of the provisions of this act, or of any law cognizable by said Commission, by any common carrier, or that any injury or damage has been sustained by the party or parties complaining, or by other parties aggrieved in consequence of any such violation, it shall be the duty of the Commission to forthwith cause a copy of its report in respect thereto to be delivered to such common carrier, together with a notice to said common carrier to cease and desist from such violation, or to make reparation for the injury so found to have been done, or both, within a reasonable time, to be specified by the Commission; and if, within the time specified, it shall be made to appear to the Commission that such common carrier has ceased from such violation of law, and has made reparation for the injury found to have been done, in compliance with the report and notice of the Commission, or to the satisfaction of the party complaining, a statement to that effect shall be entered of record by the Commission, and the said common carrier shall thereupon be relieved from further liability or penalty for such particular violation of law.

Appeal to the Courts.

SEC. 16. (*As amended March 2, 1889.*) That whenever any common carrier, as defined in and subject to the provisions of this act, shall violate, or refuse or neglect to obey or perform any lawful order or requirement of the Commission created by this act, not founded upon a controversy requiring a trial by jury, as provided by the seventh amendment to the Constitution of the United States, it shall be lawful for the Commission or for any company or person interested in such order or requirement, to apply in a summary way, by petition, to the circuit court of the United States sitting in equity in the judicial district in which the common carrier complained of has its principal office, or in which the violation or disobedience of such order or requirement shall happen, alleging such violation or disobedience, as the case may be; and the said court shall have power to hear and determine the matter, on such short notice to the common carrier complained of as the court shall deem reasonable; and such notice may be served on such common carrier, his or its officers, agents, or servants, in such manner as the court shall direct; and said court shall proceed to hear and determine the matter speedily as a court of equity, and without the formal pleadings and proceedings applicable to ordinary suits in equity, but in such manner as to do justice in the premises; and to this end such court shall have power, if it think fit, to direct and prosecute in such mode and by such persons as it may appoint, all such inquiries as the court may think needful to enable it to form a just judgment in the matter of such petition; and on such hearing the findings of fact in the report of said Commission shall

be prima facie evidence of the matters therein stated; and if it be made to appear to such court, on such hearing or on report of any such person or persons, that the lawful order or requirement of said Commision drawn in question has been violated or disobeyed, it shall be lawful for such court to issue a writ of injunction or other proper process, mandatory or otherwise, to restrain such common carrier from further continuing such violation or disobedience of such order or requirement of said Commission, and enjoining obedience to the same; and in case of any disobedience of any such writ of injunction or other proper process, mandatory or otherwise, it shall be lawful for such court to issue writs of attachment, or any other process of said court incident or applicable to writs of injunction or other proper process, mandatory or otherwise, against such common carrier, and if a corporation, against one or more of the directors, officers, or agents of the same, or against any owner, lessee, trustee, receiver, or other person failing to obey such writ of injunction, or other proper process, mandatory or otherwise; and said court may, if it shall think fit, make an order directing such common carrier or other person so disobeying such writ of injunction or other proper process, mandatory or otherwise, to pay such sum of money, not exceeding for each carrier or person in default the sum of five hundred dollars for every day, after a day to be named in the order, that such carrier or other person shall fail to obey such injunction or other proper process, mandatory or otherwise; and such moneys shall be payable as the court shall direct, either to the party complaining or into court, to abide the ultimate decision of the court, or into the Treasury; and

payment thereof may, without prejudice to any other mode of recovering the same, be enforced by attachment or order in the nature of a writ of execution, in like manner as if the same had been recovered by a final decree in personam in such court.

Appeal Not a Supersedeas.

When the subject in dispute shall be of the value of $2,000 or more, either party to such proceeding before said court may appeal to the Supreme Court of the United States, under the same regulations now provided by law in respect of security for such appeal; but such appeal shall not operate to stay or supersede the order of the court or the execution of any writ or process thereon; and such court may, in every such matter, order the payment of such costs and counsel fees as shall be deemed reasonable. Whenever any such petition shall be filed or presented by the Commission it shall be the duty of the district attorney, under the direction of the Attorney-General of the United States, to prosecute the same; and the costs and expenses of such prosecution shall be paid out of the appropriation for the expenses of the courts of the United States.

If the matters involved in any such order or requirement of said Commission are founded upon a controversy requiring a trial by jury, as provided by the seventh amendment to the Constitution of the United States, and any such common carrier shall violate or refuse or neglect to obey or perform the same, after notice given by said Commission as provided in the fifteenth section of this act, it shall be lawful for any company or person interested in such order or requirement

to apply in a summary way by petition to the circuit court of the United States sitting as a court of law in the judicial district in which the carrier complained of his its principal office, or in which the violation or disobedience of such order or requrement shall happen, alleging such violation or disobedience as the case may be; and said court shall by its order then fix a time and place for the trial of said cause, which shall not be less than twenty nor more than forty days from the time said order is made, and it shall be the duty of the marshal of the district in which said proceeding is pending to forthwith serve a copy of said petition, and of said order, upon each of the defendants, and it shall be the duty of the defendants to file their answers to said petition within ten days after the service of the same upon them as aforesaid. At the trial the findings of fact of said Commission as set forth in its report shall be prima facie evidence of the matters therein stated, and if either party shall demand a jury or shall omit to waive a jury the court shall, by its order, direct the marshal forthwith to summon a jury to try the cause; but if all the parties shall waive a jury in writing then the court shall try the issues in said cause and render its judgment thereon. If the subject in dispute shall be of the value of $2,000 or more, either party may appeal to the Supreme Court of the United Statese under the same regulations now provided by law in respect to security for such appeal; but such appeal must be taken within twenty days from the day of the rendition of the judgment of said circuit court. If the judgment of the circuit court shall be in favor of the party complaining he or they shall be entitled to recover a reasonable counsel or attorney's fee,

to be fixed by the court, which shall be collected as part of the costs in the case. For the purposes of this act, excepting its penal provisions, the circuit courts of the United States shall be deemed to be always in session.

Sessions of the Commission.

SEC. 17. (*As amended March 2, 1889.*) That the Commission may conduct its proceedings in such manner as will best conduce to the proper dispatch of business and to the ends of justice, a majority of the Commission shall constitute a quorom for the transaction of business, but no Commissioner shall participate in any hearing or proceeding in which he has any pecuniary interest. Said Commission may, from time to time, make or amend such general rules or orders as may be requisite for the order and regulation of proceedings before it, including forms of notices and the service thereof, which shall conform, as nearly as may be, to those in use in the courts of the United States. Any party may appear before said Commission and be heard, in person or by attorney. Every vote and official act of the Commission shall be entered of record, and its proceedings shall be public upon the request of either party interested. Said Commission shall have an official seal, which shall be judicially noticed. Either of the members of the Commission may administer oaths and affirmations and sign subpœnas.

Salaries of Commissioners.

SEC. 18. (*As amended.*) That each Commissioner shall receive an annual salary of $10,000, payable in the same manner as the judges of the courts of the United

States. The Commission shall appoint a secretary, who shall receive an annual salary of $3,500, payable in like manner. The Commission shall have authority to employ and fix the compensation of such other employees as it may find necessary to the proper performance of its duties. Until otherwise provided by law, the Commission may hire suitable offices for its use, and shall have authority to procure all necessary office supplies. Witnesses summoned before the Commission shall be paid the same fees and mileage that are paid witnesses in the courts of the United States.

All of the expenses of the Commission, including all necessary expenses for transportation incurred by the Commissioners, or by their employees under their orders, in making any investigation, or upon official business in any other places than in the city of Washington, shall be allowed and paid on the presentation of itemized vouchers therefor, approved by the chairman of the Commission.

SEC. 19. That the principal office of the Commission shall be in the city of Washington, where its general sessions shall be held; but whenever the convenience of the public or the parties may be promoted or delay or expense prevented thereby, the Commission may hold special sessions in any part of the United States. It may, by one or more of the Commissioners, prosecute any inquiry necessary to its duties, in any part of the United States, into any matter or question of fact pertaining to the business of any common carrier subject to the provisions of this act.

Annual Reports From Corporations.

SEC. 20. That the Commission is hereby authorized to require annual reports from all common carriers subject to the provisions of this act, to fix the time and prescribe the manner in which such reports shall be made, and to require from such carriers specific answers to all questions upon which the Commission may need information. Such annual reports shall show in detail the amount of capital stock issued, the amounts paid therefor, and the manner of payment for the same; the dividends paid, the surplus fund, if any, and the number of stockholders; the funded and floating debts and the interest paid thereon; the cost and value of the carrier's property, franchises, and equipments; the number of employees and the salaries paid each class; the amounts expended for improvements each year, how expended, and the character of such improvements; the earnings and receipts from each branch of business and from all sources; the operating and other expenses; the balances of profit and loss; and a complete exhibit of the financial operations of the carrier each year, including an annual balance-sheet. Such reports shall also contain such information in relation to rates or regulations concerning fares or freights, or agreements, arrangements, or contracts with other common carriers, as the Commission may require; and the said Commission may, within its discretion, for the purpose of enabling it the better to carry out the purposes of this act, prescribe (if in the opinion of the Commission it is practicable to prescribe such uniformity and methods of keeping accounts) a period of time within which all common carriers subject to the provisions of this act shall

have, as near as may be, a uniform system of accounts, and the manner in which such accounts shall be kept.

SEC. 21. (*As amended March 2, 1889.*) That the Commission shall, on or before the first day of December in each year, make a report, which shall be transmitted to Congress, and copies of which shall be distributed as are the other reports transmitted to Congress This report shall contain such information and data collected by the Commission as may be considered of value in the determination of questions connected with the regulation of commerce, together with such recommendations as to additional legislation relating thereto as the Commission may deem necessary; and the names and compensation of the persons employed by said Commission.

Exceptions May Be Made.

SEC. 22. (*As amended March 2, 1889, and February 8, 1895.*) That nothing in this act shall prevent the carriage, storage, or handling of property free or at reduced rates for the United States, State, or municipal governments, or for charitable purposes, or to or from fairs and expositions for exhibition thereat, or the free carriage of destitute and homeless persons transported by charitable societies, and the necessary agents employed in such transportation, or the issuance of mileage, excursion, or commutation passenger tickets; nothing in this act shall be construed to prohibit any common carrier from giving reduced rates to ministers of religion, or to municipal governments for the transportation of indigent persons, or to inmates of the National Homes or State Homes for Disabled Volunteer Soldiers, and

of Soldiers' and Sailors' Orphan Homes, including those about to enter and those returning home after discharge, under arrangements with the boards of managers of said homes; nothing in this act shall be construed to prevent railroads from giving free carriage to their own officers and employees, or to prevent the principal officers of any railroad company or companies from exchanging passes or tickets with other railroad companies for their officers and employees; and nothing in this act contained shall in any way abridge or alter the remedies now existing at common law or by statute, but the provisions of this act are in addition to such remedies:

Provided, That no pending litigation shall in any way be affected by this act:

Provided further, That nothing in this act shall prevent the issuance of joint interchangeable 5,000-mile tickets, with special privileges as to the amount of free baggage that may be carried under mileage tickets of 1,000 or more miles. But before any common carrier, subject to the provisions of this act, shall issue any such joint interchangeable mileage tickets with special privileges, as aforesaid, it shall file with the Interstate Commerce Commission copies of the joint tariffs of rates, fares, or charges on which such joint interchangeable mileage tickets are to be based, together with specifications of the amount of free baggage permitted to be carried under such tickets, in the same manner as common carriers are required to do with regard to other joint rates by section 6 of this act; and all provisions of said section 6 relating to joint rates, fares, and charges shall be observed by said common carriers and enforced by the Interstate Commerce Commission as fully with regard

to such joint interchangeable mileage tickets as with regard to other joint rates, fares, and charges referred to in said section 6. It shall be unlawful for any common carrier that has issued or authorized to be issued any such joint interchangeable mileage tickets to demand, collect, or receive from any person or persons a greater or less compensation for transportation of persons or baggage under such joint interchangeable mileage tickets than that required by the rate, fare, or charge specified in the copies of the joint tariff of rates, fares, or charges filed with the Commision in force at the time. The provisions of section 10 of this act shall apply to any violation of the requirements of this proviso.

Jurisdiction of the Courts.

NEW SECTION (*Added March 2, 1889*). That the circuit and district courts of the United States shall have jurisdiction upon the relation of any person or persons, firm, or corporation, alleging such violation by a common carrier, of any of the provisions of the act to which this is supplement and all acts amendatory thereof, as prevents the relator from having interstate traffic moved by said common carrier at the same rates as are charged, or upon terms or conditions as favorable as those given by said common carrier for like traffic under similar conditions to any other shipper, to issue a writ or writs of mandamus against said common carrier, commanding such common carrier to move and transport the traffic, or to furnish cars or other facilities for transportation for the party applying for the writ:

Provided, That if any question of fact as to the proper compensation to the common carrier for the service to

be enforced by the writ is raised by the pleadings, the writ of peremptory mandamus may issue, notwithstanding such question of fact is undetermined, upon such terms as to security, payment of money into the court, or otherwise, as the court may think proper, pending the determination of the question of fact:

Provided, That the remedy hereby given by writ of mandamus shall be cumulative, and shall not be held to exclude or interfere with other remedies provided by this act or the act to which it is a supplement.

Testimony Must Be Given.

No person shall be excused from attending and testifying or from producing books,papers, tariffs, contracts, agreements and documents before the Interstate Commerce Commission, or in obedience to the subpœna of the Commission, whether such subpœna be signed or issued by one or more Commissioners, or in any cause or proceeding, criminal or otherwise, based upon or growing out of any alleged violation of the act of Congress, entitled "An act to regulate commerce," approved February 4th, 1887, or of any amendment thereof, on the ground or for the reason that the testimony or evidence, documentary or otherwise, required of him, may tend to criminate him or subject him to a penalty or forfeiture. But no person shall be prosecuted or subjected to any penalty or forfeiture for or on account of any transaction, matter or thing, concerning which he may testify, or produce evidence, documentary or otherwise, before said Commission, or in obedience to its subpœna, or the subpœna of either of them, or in any such case or proceeding:

Provided, That no person so testifying shall be exempt from prosecution and punishment for perjury committed in so testifying.

Any person who shall neglect or refuse to attend and testify, or to answer any lawful inquiry, or to produce books, papers, tariffs, contracts, agreements and documents, if in his power to do so, in obedience to the subpœna or lawful requirement of the Commission shall be guilty of an offense, and upon conviction thereof by a court of competent jurisdiction shall be punished by fine, not less than $100 nor more than $5,000, or by imprisonment for not more than one year, or by both such fine and imprisonment.

Use of Safety Appliances.

That from and after the first day of January, 1898, it shall be unlawful for any common carrier engaged in interstate commerce by railroad to use on its line any locomotive engine in moving interstate traffic not equipped with a power driving-wheel brake and appliances for operating the train-brake system, or to run any train in such traffic after said date that has not a sufficient number of cars in it so equipped with power or train brakes that the engineer on the locomotive drawing such train can control its speed without requiring brakemen to use the common hand brake for that purpose.

SEC. 2. That on and after the first day of January, 1898, it shall be unlawful for any such common carrier to haul or permit to be hauled or used on its line any car used in moving interstate traffic not equipped with couplers coupling automatically by impact, and which can

be uncoupled without the necessity of men going between the ends of the cars.

SEC. 3. That when any person, firm, company, or corporation engaged in interstate commerce by railroad shall have equipped a sufficient number of its cars so as to comply with the provisions of section 1 of this act, it may lawfully refuse to receive from connecting lines of road or shippers any cars not equipped sufficiently, in accordance with the first section of this act, with such power or train brakes as will work and readily interchange with the brakes in use on its own cars, as required by this act.

SEC. 4. That from and after the first day of July, 1895, until otherwise ordered by the Interstate Commerce Commission, it shall be unlawful for any railroad company to use any car in interstate commerce that is not provided with secure grab irons or handholds in the ends and sides of each car for greater security to men in coupling and uncoupling cars.

SEC. 5. That within ninety days from the passage of this act the American Railway Association is authorized hereby to designate to the Interstate Commerce Commission the standard height of drawbars for freight cars, measured perpendicular from the level of the tops of the rails to the centers of the drawbars, for each of the several gauges of railroads in use in the United States, and shall fix a maximum variation from such standard height to be allowed between the drawbars of empty and loaded cars. Upon their determination being certified to the Interstate Commerce Commission, said Commission shall at once give notice of the standard fixed upon to all common carriers, owners, or lessees

engaged in interstate commerce in the United States by such means as the Commission may deem proper. But should said association fail to determine a standard as above provided, it shall be the duty of the Interstate Commerce Commission to do so, before July 1st, 1894, and immediately to give notice thereof as aforesaid. And after July 1st, 1895, no cars, either loaded or unloaded, shall be used in interstate traffic which do not comply with the standard above provided for.

Penalties for Violation.

SEC. 6. (*As amended April 1, 1896.*) That any such common carrier using any locomotive engine, running any train, or hauling or permitting to be hauled or used on its line any car in violation of any of the provisions of this act, shall be liable to a penalty of $100 for each and every such violation, to be recovered in a suit or suits to be brought by the United States district attorney in the district court of the United States having jurisdiction in the locality where such violation shall have been committed; and it shall be the duty of such district attorney to bring such suits upon duly verified information being lodged with him of such violation having occurred; and it shall also be the duty of the Interstate Commerce Commission to lodge with the proper district attorneys information of any such violations as may come to its knowledge:

Provided, That nothing in this act contained shall apply to trains composed of four-wheel cars or to trains composed of eight-wheel standard logging cars where the height of such car from top of rail to center of coupling does not exceed twenty-five inches, or to locomotives

used in hauling such trains when such cars or locomotives are exclusively used for the transportation of logs.

SEC. 7. That the Interstate Commerce Commission may from time to time upon full hearing and for good cause extend the period within which any common carrier shall comply with the provisions of this act.

Employes Do Not Assume Risk.

SEC. 8. That any employee of any such common carrier who may be injured by any locomotive, car, or train in use contrary to the provision of this act, shall not be deemed thereby to have assumed the risk thereby occasioned, although continuing in the employment of such carrier after the unlawful use of such locomotive, car, or train, had been brought to his knowledge.

Note.—Prescribed standard height of drawbars: Standard-gauge roads, 34½ inches; narrow-gauge roads, 26 inches; maximum variation between loaded and empty cars, 3 inches.

Further Provisions for Safety.

An act to amend an act entitled "An act to promote the safety of employees and travelers upon railroads by compelling common carriers engaged in interstate commerce to equip their cars with automatic couplers and continuous brakes and their locomotives with driving-wheel brakes, and for other purposes," approved March 2d, 1893, and amended April 1st, 1896.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled:

That the provisions and requirements of the Act entitled "An Act to promote the safety of employees and travelers upon railroads by compelling common carriers engaged in interstate commerce to equip their cars with automatic couplers and continuous brakes, and their locomotives with driving-wheel brakes, and for other purposes," approved March 2d, 1893, and amended

April 1st, 1896, shall be held to apply to common carriers by railroads in the Territories and the District of Columbia, and shall apply in all cases, whether or not the couplers brought together are of the same kind, make, or type; and the provisions and requirements hereof and of said Acts relating to train brakes, automatic couplers, grab irons, and the height of drawbars, shall be held to apply to all trains, locomotives, tenders, cars, and similar vehicles used on any railroad engaged in interstate commerce, and in the Territories and the District of Columbia, and to all other locomotives, tenders, cars, and similar vehicles used in connection therewith, excepting those trains, cars, and locomotives exempted by the provisions of section 6 of said Act of March 2d, 1893, as amended by the Act of April 1st, 1896, or which are used upon street railways.

Percentage of Brakes Required.

SEC. 2. That whenever, as provided in said act, any train is operated with power or train brakes, not less than fifty per centum of the cars in such train shall have their brakes used and operated by the engineer of the locomotive drawing such train; and all power-braked cars in such train which are associated together with said fifty per centum shall have their brakes so used and operated; and, to more fully carry into effect the objects of said act, the Interstate Commerce Commission may, from time to time, after full hearing, increase the minimum percentage of cars in any train required to be operated with power or train brakes which must have their brakes used and operated as aforesaid; and failure to comply with any such requirement of the said Interstate

Commerce Commission shall be subject to the like penalty as failure to comply with any requirement of this section.

SEC. 3. That the provisions of this act shall not take effect until September 1st, 1903. Nothing in this act shall be held or construed to relieve any common carrier, the Interstate Commerce Commission, or any United States district attorney from any of the provisions, powers, duties, liabilities, or requirements of said Act of March 2d, 1893, as amended by the Act of April 1st, 1896; and all of the provisions, powers, duties, requirements and liabilities of said Act of March 2d, 1893, as amended by the Act of April 1st, 1896, shall, except as specifically amended by this act, apply to this act.

CHICAGO TO	Limit, Days	LIMITED 1st Class	LIMITED 2d Class	Rate per 100 lbs. for Excess Baggage
MONTANA—Continued (For explanation of Missouri River Gateways, see page 13.)		$	$	$
Columbia Falls via St. Paul and Gt. Nor.	4	40 70	.....	6 80
do via Billings or Denver, Billings and Gt. Nor.	4	40 70	.....	6 60
do via Missouri River gateways, Billings or Denver, Billings and Gt. Nor	4	40 70	.....	6 60
Cushman via Billings and Gt. Nor.	4	32 30	.....	5 40
do via Denver, Billings and Gt. Nor.	4	37 40	.....	6 25
do via St. Paul and Gt. Nor.	4	36 90	.....	6 15
Custer via St. Paul	4	28 65	.....	4 80
Deer Lodge via C. M. & St. P.-C. M. & P. S.	4	*36 60	.....	*3 45
do via St. Paul and C. M. & St. P.-C. M. & P. S. or Nor. Pac.	4	36 60	.....	6 45
do via Billings or Denver and Billings	4	36 60	.....	6 45
do via Missouri River gateways and Billings or Denver and Billings	4	36 60	.....	6 45
do via Missouri River gateways, Granger or Ogden and Butte	4	36 60	.....	6 45
do via Denver, Colorado Spgs. or Pueblo, Ogden and Butte	4	36 60	.....	6 45
do via Missouri River gateways, Denver, Colorado Springs, Pueblo, Ogden and Butte	4	36 60	.....	6 45
do via Denver, Granger and Butte	4	36 60	.....	6 45
do via Missouri River gateways, Denver, Granger and Butte	4	36 60	.....	6 45
do via St. Louis	4	36 60	.....	6 45
Dillon via Missouri River gateways and Granger or Ogden	4	37 40	.....	6 25
do via Denver, Colorado Spgs. or Pueblo and Ogden	4	37 40	.....	6 25
do via Missouri River gateways, Denver, Colorado Springs or Pueblo and Ogden	4	37 40	.....	6 25
do via Denver and Granger	4	37 40	.....	6 25
do via Missouri River gateways, Denver & Granger	4	37 40	.....	6 25
do via St. Louis	4	37 40	.....	6 25
Dodge via C. M. & St. P.-C. M. & P. S.	2	*24 50	.....	*4 10
do via St. Paul	2	24 50	.....	4 10
Drummond via C. M. & St. P.-C. M. & P. S.	4	*39 55	.....	*6 60
do via St. Paul and C. M. & St. P.-C. M. & P. S. or Nor. Pac.	4	39 55	.....	6 60
do via ‡Billings and Nor. Pac.	4	39 55	.....	6 60
Essex via St. Paul	4	39 40	.....	6 60
do via Billings or Denver, Billings and Gt. Nor.	4	39 40	.....	6 60
do via Missouri River Gateways, Billings or Denver, Billings and Gt. Nor.	4	39 40	.....	6 60

CHICAGO TO	Limit, Days	LIMITED 1st Class	LIMITED 2d Class	Rate per 100 lbs. for Excess Baggage
MONTANA—Continued (For explanation of Missouri River Gateways, see page 13.)		$	$	$
Forsyth via C.M.& St.P.-C.M & P.S.	3	*27 20	.....	*4 55
do via St Paul	3	27 20	.....	4 55
Fromberg via C. B. & Q.	4	31 35	.....	5 25
do via Missouri River gateways and C. B. & Q.	4	31 35	.....	5 25
do via Billings and Nor. Pac.	4	31 35	.....	5 25
do via St. Paul and Nor. Pac.	4	31 35	.....	5 25
do via Denver and C. B. & Q.	4	38 05	.....	6 35
do via Denver, Billings and Nor. Pac.	4	38 05	.....	6 35
do via St. Louis	4	33 20	.....	5 55
Gardiner via St. Paul and Nor. Pac.	4	33 35	.....	5 90
do via Billings	4	33 35	.....	5 90
do via Denver and Billings	4	38 05	.....	6 35
do via St. Louis and Billings	4	33 35	.....	5 90
Garrison via C. M. & St. P.-C. M. & P. S.	4	*36 95	.....	*6 50
do via St. Paul and C. M. & St. P.-C. M. & P. S. or Nor. Pac.	4	36 95	.....	6 50
do via Billings or Denver and Billings	4	36 95	.....	6 50
do via Missouri River gateways and Billings or Denver and Billings	4	36 95	.....	6 50
do via Missouri River gateways, Granger or Ogden and Butte or Silver Bow	4	36 95	.....	6 50
do via Denver, Colorado Spgs. or Pueblo, Ogden and Butte or Silver Bow	4	36 95	.....	6 50
do via Missouri River gateways, Denver, Colorado Springs, Pueblo, Ogden and Butte or Silver Bow	4	36 95	.....	6 50
do via Denver, Granger and Butte or Silver Bow	4	36 95	.....	6 50
do via Missouri River gateways, Denver, Granger and Butte or Silver Bow	4	36 95	.....	6 50
do via St. Louis	4	36 95	.....	6 50
Glasgow via St. Paul	4	28 60	.....	4 60
Glendive via St. Paul and Nor. Pac.	4	23 50	.....	3 95
Great Falls via St. Paul and Gt. Nor.	4	36 90	.....	6 15
do via Missouri River Gateways, Billings or Denver, Billings and Gt. Nor.	4	37 40	.....	6 25
Hamilton via St. Paul and Nor. Pac.	4	42 45	.....	7 10
do via Billings or Denver and Billings	4	42 45	.....	7 10
Harlowton via C. M. & St. P.-C. M. & P. S.	4	*32 35	.....	*5 40
do via St. Paul and C.M.& St. P.	4	32 35	.....	5 40
Helena via St. Paul and Gt. Nor. or Nor. Pac.	4	37 40	.....	6 25
do via Billings or Denver, Billings and Nor. Pac.	4	37 40	.....	6 25
do via Missouri River gateways and Billings or Denver, Billings and Nor. Pac.	4	37 40	.....	6 25
do via Missouri River gateways, Granger or Ogden, Butte and Gt. Nor.	4	37 40	.....	6 25

*Basing fare only.
‡Also applies via C. B. & Q. to Billings via Denver or via any route to Denver thence C. B. & Q. to Billings.

Sample Page of Joint Passenger Tariff from Chicago to Destinations in the United States, Canada, Mexico, Cuba, and Central and South America.

CHAPTER XVII (PART 2).

INTERSTATE COMMERCE REGULATION.

In the early days of railroad construction in the United States the question was "how to get railroads, not how to control them." Indeed it is probably true that capitalists would not have put their money into the building of railroads if their operation had been governed by the detailed regulations now in force. Private enterprise would have been so far discouraged as to have made the remarkable era of railroad construction from 1850 to 1885 entirely impossible. But it is also probable that if careful governmental supervision had attended the operation of our first railroads, most of the modern evils of railroad management would have been avoided.

The common law declared that rates must be "reasonable," but failed to provide any means of fixing a reasonable rate. At first, when every new railroad was a boon to everyone, almost any rate was reasonable in comparison with the old wagon rates. Shippers remembered that the wagon rate from Philadelphia to Pittsburgh prior to the construction of the railroads was $125 per ton.

As a result of the lax laws intended to stimulate construction the officials and stockholders of railroads were led to believe that they could operate their roads

just as they pleased, without regard to the public interest. Hence they "charged the traffic what it would bear." They recognized no duty to the community, no public trust. If conditions permitted them to exact very high rates, they regarded it as their right to do so. If favoritism was shown to powerful shippers and important localities, it was regarded as good business policy. The only duty recognized was that to the stockholders.

Movement for Federal Regulation.

By the year 1885, however, the American public began to realize that the vital problem was no longer how to stimulate construction, but how to control the roads already in operation so as to make them serve the public to the best advantage. The authority of each State being limited to the control of railroad services and charges within its own boundaries, it became evident that the Federal Government must cooperate with the states in order to solve the problems connected with interstate commerce.

The movement for Federal regulation of railways began in 1872, when upon a recommendation made by President Grant in his annual message, the Senate of the United States appointed a committee to make a thorough investigation of the situation. This committee reported in 1874 in favor of Federal legislation. Action was deferred, however, and the first real step toward framing a law to meet and prevent the prevailing evils was not taken until March 17, 1885, when the Senate

adopted a resolution authorizing the President to appoint a committee of senators to investigate and report on the subject of the "regulation of transportation by railroad, and by water lines in competition or connection therewith, of freight and passengers between the several states." This committee, headed by Senator Cullom of Illinois, reported in 1886, with a bill for the Federal regulation of railways, and this bill, with various amendments, became the Interstate Commerce Act, which was enacted in 1887.

The act of 1887 has been strengthened from time to time by amendments. The Elkins act of 1903 made very important changes in the law, while the Hepburn act of 1906 brought the legislation practically to its present shape. The former law was aimed particularly at the prevention of discriminations; while the Hepburn act gave the Interstate Commerce Commission, which had been created by the act of 1887, the power to revise railway rates and to prescribe uniform accounting.

Changes in the Common Law.

The principal changes in the common law made by the act of 1887 were as follows:

(a) It required publicity of rates and of rules affecting rates, and provided that the only legal rate was that published and filed in accordance with the act, thus creating a definite standard of charge equally accessible to all shippers.

(b) It incorporated into a statute the common law duty of refraining from exacting unreasonable charges,

and from unduly discriminating between shippers or localities in rates or facilities.

(c) It created a commission to supervise and regulate the publicity requirements, with limited powers to enforce the other provisions of the act.

(d) It gave to the Federal courts jurisdiction to enforce by injunction the lawful orders of the commission.

(e) It created penal and criminal liability on the part of the officers of common carriers for violating provisions of the act.

(f) It required the allowance of equal facilities to competing lines.

In 1889 the following important provisions were introduced into the law:

(g) Providing a remedy by mandamus without previous investigation by the commission in case of denial of equal facilities to shippers.

(h) Creating penal and criminal offenses on the part of shippers in respect to obtaining lower rates by means of false billing and similar devices.

(i) Providing for punishment by imprisonment of the officers of common carriers violating the provisions of the act prohibiting the giving of rebates and discriminations.

(j) Requiring the publication of joint tariffs.

The Elkins Act.

The changes in the Interstate Commerce law made by the Elkins act were as follows:

(a) It abolished imprisonment as a punishment for

violating the Interstate Commerce act. [The imprisonment penalty was restored by the Hepburn act in 1896.]

(b) It made the carrier corporation criminally responsible, as well as its officers.

(c) It made shippers who received rebates criminally liable for so doing.

(d) It gave the courts jurisdiction to enjoin violations of the act without previous investigation by the commission.

The Hepburn Act.

The most important changes introduced by the Hepburn act were as follows:

(a) It gave the commission power, after due investigation, to fix rates to be observed in the future, and prescribed a prohibitive penalty—$5,000 a day—for disobeying the orders of the commission regarding rates.

(b) It made it the statutory duty of common carriers to provide and furnish transportation on reasonable request therefor.

(c) It required connecting lines to form through routes with joint rates applicable thereto.

(d) It prohibited carriers from transporting commodities produced by them, or in which they had an interest.

(e) It restored the imprisonment clause expunged by the Elkins act and created a number of other punishable offenses.

(f) It required carriers to construct, maintain and

operate switch connections for shippers and for lateral branch lines.

(g) It introduced a clause regulating the issuance of passes.

(h) It altered the time of notice of increase or reduction of rates to 30 days, and otherwise modified the requirements with regard to publication and filing of rates.

(i) It gave the commission power to regulate the allowances to shippers for services.

(j) It extended the operation of the act to express and sleeping car companies and to pipe lines.

(k) It increased the membership and salaries of the commissioners.

(l) It gave the courts additional powers to issue mandamus.

(m) It introduced a provision making carriers, parties to through transportation, liable for losses beyond their own lines, and forbidding limitation of liability.

(n) It regulated the methods for enforcing the orders of the commission.

(o) It introduced regulations governing suits to set aside or suspend orders of the commission.

(p) It introduced provisions regarding the reports and accounts to be furnished by carriers to the commission.

Purposes of the Act.

It is obvious that the purpose for which the Act to Regulate Commerce was passed was to remedy the

recognized evils and abuses in the operation of the railroads in the United States. These evils included the exaction of excessive charges to or from non-competitive points; preference in rates and consequent building up of certain favored localities at the expense of outlying points; and especially the allowance of special facilities and concessions in rates to large and powerful shippers, enabling them to drive their weaker competitors to the wall.

In its second annual report the Interstate Commerce Commission said: "The purpose of the Act to Regulate Commerce may be summed up in a single phrase; it is to bring the railroads of the country under the control of law representing an enlightened public opinion."

In his decision of the case Re Chicago, St. P. & K. C. R. Co. (2 I. C. C. Rep. 231, 259) Chairman Cooley of the Commission said: "As a matter of public history nothing can be more notorious than that the Act to Regulate Commerce had for its leading and general purpose, to which other purposes were subordinate, to provide effectual securities that the general public, in making use of the means of railroad transportation provided by law for their service, should have the benefits which the law had undertaken to give, but of which in very many cases it was found the parties entitled to them were deprived by the arbitrary conduct, the favoritism, or the unreasonable exactions of those who managed them. It may be affirmed with entire confidence that the act was not passed to protect railroad corporations against the misconduct or the mistakes of

their officers, or even primarily to protect such corporations against each other. . . . Everywhere in the act the primary purpose apparent in its provisions is that individuals dealing in matters of transportation with the carriers regulated by it shall not, in respect to the conveniences the carriers are supposed to offer to the public, be wronged by arbitrary conduct or by favoritism, or be subjected to extortion."

And Mr. Justice White, of the United States Supreme Court, in the case of New York, N. H. & H. R. Co. vs. I. C. C. (200 U. S. 361), said: "It cannot be challenged that the great purpose of the Act to Regulate Commerce, whilst seeking to prevent unjust and unreasonable rates, was to secure equality of rates as to all and to destroy favoritism, these last being accomplished by requiring the publication of tariffs and by prohibiting secret departures from such tariffs, and forbidding rebates, preferences and all other forms of undue discrimination. . . .

"If the public purpose which the statute was intended to accomplish be borne in mind, its meaning becomes, if possible, clearer. What was that purpose? It was to compel the carrier as a public agent to give equal treatment to all."

Main Provisions of the Law.

As now amended, the main provisions of the Interstate Commerce Law have been summarized by Professor Emory R. Johnson as follows:

1. The law applies to passenger and freight traffic carried by railways or by a joint rail and water route;

to express and sleeping car companies; to pipe lines, and to private car lines. It does not apply to the traffic carried upon all-water routes.

2. It is made unlawful to charge extortionate rates or those which unjustly discriminate between places, persons or commodities. Free passes are prohibited, and railway companies are not allowed to be producers of any commodities they carry, with the exception of lumber.

3. It is unlawful for a carrier to "receive any greater compensation in the aggregate for the transportation of passengers or like kinds of property, under substantially similar circumstances and conditions, for a shorter than for a longer distance over the same line, in the same direction, the shorter being included within the longer distance." But the Commission has power to suspend the enforcement of this provision in the case of carriers that have to meet exceptional conditions of competition. This is known as the "long-and-short-haul" clause.

4. Railways are not allowed to pool their freight traffic or the earnings from their freight or passenger business.

5. All railroad rates and fares must be printed and filed with the Interstate Commerce Commission. No rates can be put into force until 30 days after they have been filed, nor can they be changed except upon 30 days' notice to the Commission, unless the Commission gives permission to the carriers to change the rates in less than 30 days.

6. The penalty for violating the act is a fine of

$5,000 for each offense. If the offense be an unlawful discrimination in rates or charges, this penalty may be increased by imprisoning the guilty officials for a term not exceeding two years, and the offending corporations may be subjected to a fine of $1,000 to $2,000 for each day during which the offense is committed.

7. The administration and enforcement of the act is intrusted to an Interstate Commerce Commission of seven members. One member is appointed each year for the term of seven years at a salary of $10,000 per annum. The principal office of the Commission is in Washington, D. C.

8. The Commission has the power to investigate the railways either upon complaint or upon its own motion. The Commission cannot prescribe rates; but, upon complaint and after investigation, it can require the carriers to change the fares or rates that have been found to be unreasonable. The equity of the Commission's order as to rates can be tested in a Federal court by formal proceedings instituted by the carriers.

9. Carriers must obey the orders of the Commission within 30 days, unless the carriers can secure from a Federal court an injunction suspending or annulling the Commission's order.

10. Railways subject to the act must make monthly reports to the Commission regarding accidents, operating revenues, and expenses; and must submit an annual report containing detailed information concerning practically every phase of their operations and finances.

11. All the accounts kept by railway companies must be in accordance with a uniform system pre-

scribed by the Commission, which has the power to inspect the books of the railways, and thus to enforce its system of uniform accounting.

Powers of the Commission.

In the great task of regulating the railways the Interstate Commerce Commission proceeds by virtue of three general classes of powers:

First, the power of investigation. The operations of the interstate railways are now public. Their practices are known to the Commission, and abuses, when known, can be corrected.

Second, the Commission has the power to adjust rates and fares—not merely to investigate them, but to correct them. This is of the utmost importance to the people of the United States, by securing the equitable adjustment of railway charges among competing localities.

Third, the Commission has the power to regulate the services and accounts of the carriers. It is thus enabled to exercise a direct influence for the public good upon the management of railway companies. Its powers include the supervision of safety appliances, block signaling and train control on all railroads in the United States. This increases the safety of travel and the general efficiency of the passenger and freight services throughout the country.

The past decade has witnessed a vast change in public sentiment regarding the regulation of the railroads, and at the present time (1916) the work of the Inter-

state Commerce Commission is strongly supported by enlightened public opinion.

Since the enactment of the interstate commerce laws the meaning of practically every section has been passed upon by decisions of the Federal, district, appellate and Supreme Courts; and while the scope of these laws has been narrowed in many instances, it has been widened in others by judicial interpretation.

Interstate Commerce Decisions.

Just as the State courts may pass upon the reasonableness of the rates charged by the railways upon traffic moved entirely within the State, so the United States courts are empowered to determine the reasonableness of rates fixed by the railroads upon interstate traffic, and may also pass upon the constitutionality of charges fixed by Congress, by the Interstate Commerce Commission, by State legislatures, and by State railroad commissions. The courts may also be appealed to for injunctions to prevent carriers from charging extortionately high, or destructively low, rates.

Some of the more important decisions in interpretation of the interstate commerce laws may be briefly summarized here.

1. The present tendency of the courts is to give the act a broad construction. According to Mr. Justice White, "the statute was remedial and is therefore entitled to receive that interpretation which reasonably accomplishes the great public purpose which it was enacted to subserve."

2. The act did not create new powers in any railroads, but simply regulated those already existing. Where, therefore, one road had by agreement allowed another to run trains over its tracks with the proviso that the latter should do no local business, the Commission refused to require the stoppage of its trains at local stations, on complaint of discrimination against such stations. (Alford vs. Chicago, R. I. & P. R. Co.)

3. The act deals only with the obligations of the carriers as common carriers, and in no way regulates or interferes with matters not involving their duty to shippers or passengers as such. For instance, it does not prevent a railroad from leasing all its refrigerator cars from one individual or company, though the latter be a large shipper in addition to being a lessor of such cars. (9 I. C. C. Rep. 182.)

4. It is the carriers' duty under the law to provide adequate service, including refrigeration and similar facilities; also through routes, joint rates, and switch connections.

5. When a shipment between points in the same State proceeds over a line which passes en route through another State, this is interstate commerce subject to the act. (2 I. C. C. Rep. 375, 386.) The same rule would probably hold in case of a shipment through the United States from one foreign country to another.

6. The act does not apply to a discrimination between two Canadian points on shipments into the United States. (10 I. C. C. Rep. 217.)

7. The act applies to street railways and to electric railroads, but not to omnibus companies, or to wagon

and team traffic, even where the teams are controlled by a railroad.

8. "A joint rate is a rate over a through route, every part of which has been made by express agreement between the carriers making the through route."

9. Under the act it is not sufficient that a rate be not extortionate; it must also be relatively fair and just with reference to other rates. (1 I. C. C. Rep. 215.)

10. Both the cost of the service to the carrier and the value of the service to the shipper enter into the determination of practically all rates, and a rate must be considered from both points of view. The carrier cannot charge exorbitant rates, though the traffic will stand such rates; nor can it be required to haul goods at a loss merely because the traffic will not bear remunerative rates. The rate must be adjusted within these two extremes. (4 I. C. C. Rep. 588, etc.)

11. "A reasonable rate is one that will make just and fair return to the carrier when it is charged to all who are to pay it without unjust discrimination against any, and when the revenue it produces is subject to no improper reductions." (4th Annual Report of the Commission.)

12. "What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience." The test is not the amount spent by the railroad, but the value of what is used for the public benefit. Extravagant management is therefore no excuse for high rates. When a rate yields a reasonable return on capital invested, the railroads are not

justified in increasing it merely because additional revenue is needed. (10 I. C. C. Rep. 548.)

13. While under ordinary circumstances a rate should increase with the distance, this is true only of the total rate, and it is firmly established, as a general rule, that the rate per ton-mile should decrease as the distance increases. The rule has been thus stated by Commissioner Morrison: "It is as nearly settled as anything relating to railroad charges can be, that under like conditions freight can be profitably carried long distances at rates proportionately lower than short distances."

14. A rate in a direction in which there is a prevalence of empty cars may properly be lower than in the opposite direction, in which cars are scarce. This consideration is often the logical explanation of differences between east-bound and west-bound rates.

15. Rates through a sparsely settled country are properly higher than those through a region where the volume of the traffic is greater, and as a general rule an increase of tonnage should result in a lowering of rates. (4 I. C. C. Rep. 48, 72.) This principle, however, is not always applicable to freight rates. The Commission would probably refuse to sanction a lower rate because of increased volume of traffic for a specific individual or locality, but would favor such where it inured to the benefit of all shippers alike.

16. Where the value of an article enters into the determination of the proper rate to be charged for its transportation, the market value is the test, and not the intrinsic value. If the shipper advertises and sells a

commodity as an expensive article, the carrier is entitled to transport it as such. (4 I. C. C. Rep. 32, 38.)

17. The Supreme Court having held that competition between carriers subject to the act justifies rate preferences between localities, the Commission recognizes that a competitive point may properly be allowed better rates than a non-competitive one, provided the rates allowed the former are remunerative and those to the latter are not "unreasonable per se"—that is, when they yield no more than a reasonable return to the carrier for the service rendered. Competition among carriers, however, does not justify rate discriminations among individuals, but only preferences among localities.

The above summary of a few of the decisions of the Interstate Commerce Commission which have been supported by the courts in their interpretation of the law, are sufficient to indicate the value to the public of the Act to Regulate Commerce, and the efforts made by the Commission to enforce the law in the public interest.

TRANSPORTATION

BY

WATER

"It is my conviction that a deep waterway across the State of Illinois would be worth all it could possibly cost, within the limits of the most liberal estimates which has ever been placed upon it, even were there no Mississippi to receive its affluent waters, and no hope of ever floating a craft beyond the line which limits the sovereignty of the commonwealth."—*Isham Randolph, Chief Engineer Chicago Sanitary District.*

CHAPTER XVIII.

TRANSPORTATION BY WATER.

Traffic moving by water consists almost entirely of passenger and freight business. The domestic express business by water routes is negligible, and the only domestic movement of mail is on local routes of slight importance. Since the advent of railroads the importance of passenger traffic on water routes has greatly declined, especially on inland streams, while on State and private canals this traffic has practically disappeared. On the Ohio and Mississippi rivers the through-passenger business, once so famous, no longer exists, and while some packet lines there are still actively engaged in the transportation of passengers, this traffic is limited in the main to local movements or to the excursion business, and as a whole is of very small importance.

Large Business on Scenic Routes.

On other routes the situation is different. On tidal streams connected with ocean routes, or where scenic attractions offer popular routes, such as the Hudson, Potomac, St. Johns and Columbia rivers, the passenger business still thrives to a considerable extent. In like manner finely equipped lines of passenger vessels use Long Island Sound, Chesapeake Bay, and the Great Lakes and their connecting channels.

A considerable passenger business is also done by coastwise lines. From New York and from other ports

on the North Atlantic passenger steamers move to every port of importance on the Atlantic and Gulf coasts and also to the British maritime provinces and the West Indies, to Mexican and Central and South American ports, not to mention the trans-Atlantic movement to European ports. On the Pacific coast several passenger lines connect San Francisco with other Pacific coast ports in California, Oregon and Washington, as well as with ports in Alaska, Hawaii, and the Canal Zone, British Columbia, and Mexican and Central American ports. Many of the coastwise passenger vessels are of excellent efficiency and equipment.

Official Figures of Passenger Traffic.

The total movement of passengers by water in a year is indicated in the following table from the United States Census Report on Transportation by Water:

Division.	Ferry passengers.	All other passengers.	Total.
Atlantic and Gulf coasts	272,596,670	19,958,746	292,555,416
Pacific coast (including Alaska)	39,532,354	4,657,617	44,189,971
Great Lakes and St. Lawrence river	8,264,482	5,815,664	14,080,146
Mississippi river and tributaries	10,022,612	4,099,629	14,122,241
Other inland waters	321,521	1,556,368	1,877,889
Total	330,737,639	36,088,024	366,825,663

It will be noted that nine-tenths of the total number of passengers were carried by ferryboats, a distinctly local movement. The total of water-borne passengers by other than ferryboats is less than one-twentieth of the total number of passengers carried by railroad.

The Atlantic and Gulf coasts constitute by far the most important district in the number of passengers carried. The Great Lakes rank second, but their pas-

senger traffic is not much in excess of the Pacific coast or the river movement. In all of the great divisions the late statistics show a considerable increase of traffic over 1889. This is most notable in the Great Lakes (260.7 per cent) and the Pacific coast (237.5 per cent). On the Atlantic and Gulf coasts and the rivers, the increase for this period was about 72 per cent for each of these districts.

Movement of Freight Traffic.

Freight may be readily divided into two main classes —package freight and bulk freight. Package freight includes all kinds of general merchandise and manufactured goods usually carried in bags, boxes, barrels, and other packages. Freight of this description moves over every natural and artificial waterway of any importance. The principal movements of package freight, however, are between New England ports and the port of New York, between the various North and South Atlantic and Gulf ports, and the movement on the Great Lakes and on the Pacific coast.

Bulk freight includes coal, iron ore, lumber, grain, oil, stone, and farm products, which are generally shipped in bulk and to a large extent in cargo lots.

More in detail freight may be classified as follows: Minerals (anthracite coal, bituminous coal, ores, stone, sand, etc.) ; mineral products (petroleum and other oils, ice, cement, lime, phosphate and fertilizer, pig iron and steel rails, etc.) ; forest products (logs, piling, cross-ties, lumber, naval stores, etc.) ; agricultural products (grain, hay, cotton, fruits, vegetables and tobacco) ; fish, oysters,

and live stock; miscellaneous (commodities not included in any of the above classes).

Need of Water Transportation.

In an official report Mr. Herbert Knox Smith, Commissioner of Corporations, says:

"Our increasing commerce demands that our waterways shall be made an active part of our transportation system. Our inland rivers are not so now. Waterways themselves and their conditions must be so improved that they shall carry a share of the nation's traffic proportioned to their real possibilities, and shall so supplement the rail system as to prevent the recurrence of disastrous traffic congestions. Waterway traffic has its inexorable limitations. Waterways also have their enormous possibilities. If, guided by the facts, we direct our attention to those lines of effort where success is possible, we shall utilize these possibilities."

Our coast line is over 5,700 miles, or, with the indentations of the coast, over 64,000 miles. The Great Lakes shore line of the United States is 2,760 miles, or, with the indentations, 4,329. These lakes are connected with each other, and by canals with the Atlantic Ocean, St. Lawrence River, and the Mississippi River, there being, however, a channel of but 14 feet feet depth to the St. Lawrence, and this through Canadian territory, 7 feet to the Atlantic through the Erie Canal, and a still less depth to the Mississippi.

Mileage of Available Routes.

There are over 290 streams in the country used to a substantial degree for navigation, with an approximate

navigable mileage of 26,400, but with very little direct connection with each other except the Mississippi system.

About 4,500 miles of canals have been constructed. More than one-half—2,444 miles, costing over $80,000,000—has been abandoned. State canals, however, still operate in New York, Ohio, Illinois, and Louisiana, with a total mileage of nearly 1,360, and there are also 16 private canals of some importance in operation, with a total mileage of 632.

Defects of Present System.

Transportation by water now suffers from one far-reaching disadvantage which we can largely remedy, namely, the lack of organization of our waterway system as a whole. At present we can hardly be said to have a general waterway system. Our great total mileage of waterways is split up by certain physical characteristics into a number of largely unrelated parts. Part of the waterways consists of ocean routes of unrestricted depth and width. Part consists of lake routes of unrestricted depth except in certain very important connecting channels. The rest consists of river and canal channels of varying and always restricted depth, of narrow width, devious courses, and with more or less current and obstructions. Most of the rivers are navigable at present only for light-draft boats. At ordinary stages of water about 40 streams have a total of at least 2,600 miles of 10-foot navigation; 70 streams, including parts of some of the 40 mentioned, give about 3,200 miles additional from 6 to 10 feet, a total of 5,800 miles of river navigation of 6 feet and over. But, again, these totals do not mean that there are any such continuous stretches

of inland waterways of these respective depths. Very few of the Atlantic rivers have more than 100 miles of a depth of 6 feet. The Mississippi system has about 2,500 miles of 6-foot navigation.

Lack of Continuous Routes.

Our canals also are largely disconnected with one another, and of varying depths. Excluding the short government canals like the St. Marys Falls Canal, there are 13 miles of canals in operation with 10 feet depth, about 1,200 miles of 6 to 10 feet (mostly 6), and about 750 miles of 4 to 6 feet depth.

Interior waterways are indeed largely disconnected. But added to this is also a great difference in vessels using them, so that they are not generally "interchangeable" over different waterways. For example, on the Mississippi the shallow depth and the constant backing and turning at the innumerable bends make the stern-wheel paddle the only method generally successful; and, on the other hand, this latter is, of course, wholly unsuited for the open sea. Again, naval architects assert that, even were the large bulk freighters of the lakes brought to tidewater it would be preferable, and almost necessary, to tranship there; that these freighters are not adapted to ocean conditions.

Character of Vessels Engaged.

Vessels differ still further according to the nature of the freight. Many are adapted for a given traffic only. There are grain, ore, coal, fruit, lumber and oil vessels. This applies especially to bulk freight. Much more than three-fourths of the traffic on the Mississippi system is

carried in bulk by barges and rafts. Over 80 per cent of the Great Lakes business is bulk traffic. A very important part of the coastwise traffic, especially coal, is bulk cargo.

A great part of the traffic is through freight. Our waterways are now divided by differences in channels, etc., and by diversity in floating equipment. The rail system of the country is standardized, physically unified, and its control is largely centralized. It is well adapted to handle such through freight. A share, at least, of this through freight is essential for the success of either system. There has been bitter competition between rail and river lines. But the inland water system, divided and disorganized by the conditions described, is greatly handicapped, especially as to through traffic.

What Should Be Done.

Under a general plan, inland waterways can be made much more of a commercial unit. They must be placed in such a position that they can secure, even against rail competition, a far greater proportion than now of the traffic. River and canal traffic is insignificant as compared with rail traffic.

We must, of course, recognize that no reasonable expenditure will wholly remove these difficulties. For instance, it is probable that transshipment from rail to water, or from one water carrier to another, will continue to be necessary on most long inland or partly inland hauls. Transshipment means terminals. It is sufficient to say now that terminal improvement is greatly needed and is entirely possible.

Policy of Federal Improvement.

Since 1870 a general policy of Federal waterway improvement has been followed. The total Federal appropriations for inland river improvements up to 1915 have been over $350,000,000. There has been very little co-operation between the central and local authorities. This has resulted in inevitable lack of uniformity and of comprehensive plan, and in the lack of any proportionate contribution from the localities peculiarly benefited. European countries have in many cases distributed the costs of waterway improvements upon localities in some ratio with the special benefits received. Such co-operation is worthy of careful consideration in any comprehensive plan of waterway improvement.

The total gross tonnage of documented vessels in the domestic trade in 1896 was 3,858,927 tons; in 1915, 6,818,363 tons, a gain of 76 per cent. American vessels in the foreign trade, whose tonnage reached its maximum in 1860, declined until 1898. Between 1896 and 1915 there was an increase of only 25 per cent in this latter tonnage.

Corporations Are Largely Interested.

Corporations control the great proportion of the steam tonnage, particularly the larger vessels. Recently the average size of vessels owned by individuals was 113 tons; by firms, 223; and by corporations, 526. There was also a proportionate increase of corporate ownership of barge lines, and even of sailing vessels, though not so marked as with steamers. There has been a recent tendency toward consolidation of many lines under single corporations.

Returns as to earnings and expenses were highly unsatisfactory. Only a few rough conclusions can be drawn therefrom. Operating expenses averaged, for the companies making returns, about 80 per cent of the gross earnings, the lowest ratio of operating cost being that of the bulk-cargo vessels of the Great Lakes. The highest ratio is that of the packet lines on the Mississippi system and southern rivers.

Marine insurance rates on river traffic reflect in a striking way the differences in waterway improvement, navigability, and dangers. The cost of cargo insurance is often a determining factor as between rail and water shipments, especially on rivers.

Nature of Government Work.

Canals owned by the Government form links in through water routes, such as the St. Marys Falls Canal, rather than distinct routes in themselves. The improvement of rivers by the Government has consisted in the removal of obstructions to navigation, the deepening of channels, the construction of revetments, and the development of slack-water navigation by the building of locks and dams for the purpose of maintaining a proper depth. Such improvements have been carried out to some extent on most of the navigable streams of the country, the most comprehensive and connected system of river improvement being that of the Mississippi and some of its important tributaries.

A Question of Economy.

Since such a large portion of our traffic is long-distance, and will thus involve transshipment, the question

of the future development of our inland waterways resolves itself into one of relative operating expenses and of investments of capital. There is little doubt that for a given distance a continuous water haul in a boat of even moderate size is, and will continue to be, cheaper in operating costs alone than a similar continuous rail haul. If the channels are made deep enough to permit the use of relatively large boats, this greater cheapness will, in some cases, be sufficient to cover also the additional cost of transshipment. The question is, however, whether besides doing so it will afford enough saving to cover reasonable interest on the investment in waterways and water terminals necessary to secure such measure of efficiency. This is a question which can only be answered after most exhaustive engineering estimates of the cost of constructing waterways of different depths and most thorough investigations of operating expenses of different kinds and sizes of vessels, in comparison with expenses of rail transportation.

Railways at their Limit.

It should be noted, however, in considering how far expenditures of capital for improved water routes are advisable, that in some cases the railroads have already reached the limit of their carrying capacity and that they will have to make additional investments of capital if they are to meet the demands of transportation. The relative amount of investment necessary thus to increase the facilities of the railroads, as compared with the investment necessary to afford adequate water routes and terminals, must therefore likewise be taken into account.

Shipping Contracts and Documents.

Transportation by water is the oldest method of long-distance traffic. It is in large measure governed by a body of world-wide maritime usages of remote origin. These customs have, however, been modified by statute, especially since the development of inland navigation and its closer connection with railroads. Various ports also have local rules.

In securing cargoes, regular steamship lines, like railroads, make use of traffic agents of their own, but in the case of bulk cargoes and "tramp" vessels ship brokers, acting for both parties, are often employed.

Charters and Bills of Lading.

The vessel may be let or hired by a charter, or the vessel may have a regular route, its owner or operator accepting shipments as a common carrier, in which case it is technically known as a "general ship." The two instruments most commonly employed in contracts of carriage are the charter party and the bill of lading. The former is a contract for the whole or a large part of the vessel; the latter for a smaller and varying portion of the vessel's capacity. There are numerous forms of both classes of documents employed, although efforts have been made to secure the use of uniform contracts.

The practice of leasing vessels is quite common throughout the United States. In some instances all the vessels of an operating company are chartered by it from the owners. Some vessels operated in the foreign trade are chartered by the year from foreign owners.

Bills of lading issued by vessels correspond in a general way to those issued by railroads. There is considerable diversity, especially in clauses limiting the liability of the carrier. The New York Produce Exchange steamship bill of lading is one often employed. Some clauses in many bills of lading appear to conflict with the provision in the Harter Act prohibiting a vessel owner from inserting stipulations to relieve himself from the results of negligence.

Manifests and Government Regulation.

These correspond to railroad waybills, showing the cargo of vessels on each voyage. In the case of foreign voyages, and on the Great Lakes, manifests must be filed with the customs officers; but they are not ordinarily required to be filed for other coastwise or river routes. This is a serious obstacle to the collection of complete statistics of water-borne traffic in the United States

The interstate-commerce acts have been applied only in a limited degree to carriers by water; and it is uncertain how far the provisions of these acts as to rates and carriers' liability are intended to apply to water lines. This is in marked contrast with the close supervision over vessels and their officers for the protection of life. In this latter respect water traffic has long been far more closely regulated by government control than railroad traffic. The detailed strictness with which the construction, operation, and maintenance of vessels is watched by the Government, and its complete system of inspection thereof, is in very marked contrast to the almost complete absence of such control over railroads.

This difference, also, has borne with some disproportionate weight on the water traffic.

On the other hand, governmental control of rates has been much more complete over railways than over waterways.

Cost of Marine Insurance.

Marine insurance charges are an important factor as an addition to the cost of transportation by water, and they must be taken into consideration in comparing the relative economy of rail and water routes. Since the floating equipment and cargoes protected by insurance are of various kinds, there is a similar diversity in the types and stipulations of insurance policies. As regards vessels, there are river hull policies, ferryboat hull policies, inland hull, tug, yacht, schooner, and steamboat policies. As regards cargoes, there are cotton policies, coal, lake-cargo, and river-cargo policies. There are also blanket policies on hull and cargo and on all the vessels and cargo of particular lines.

Features of Marine Insurance.

There is considerable variety both in the manner of effecting insurance on vessels and cargoes and in rates of premium, not only on the different waterways of the country, but also in respect to the several types of vessels and the freight transported. Inland policies are peculiar in the restrictions upon the routes on which the craft may operate, and in the varying rates of premium on different streams. Some vessels carry only fire insurance, others both fire and marine insurance, and others fire, marine, and port insurance. Often no vessel insurance or insurance of any kind is carried.

Some vessel owners are their own insurers, providing special reserve funds for that purpose. Insurance on vessels is usually by the year, often with lay-up clauses applicable to the period during which navigation is suspended.

Insurance of Cargoes.

Cargo insurance in some cases is entirely attended to by the vessel owner on behalf of the shipper or consignee. Frequently, however, it is effected on each shipment by the shipper and continues until the vessel reaches the port of destination or for a certain time thereafter. In other cases, however, the vessel owner or owner of cargo lots takes out a blanket policy covering all shipments for a given period.

Most river steamboats and package freight shipments seem to be protected by insurance. Differences in the conditions of river improvement, navigability, and river dangers are reflected in the insurance rates. In fact, the cost of insurance is often a determining factor as between rail and river shipments. The rail carrier being practically, by law, the insurer of the freight, insurance on rail freight is a negligible consideration to the shipper. But on water, and especially river traffic, this is by no means so.

Rates of Marine Insurance.

Selected river insurance rates have been as follows: A company operating on Virginia and Maryland waterways reports that the insurance premium for a recent fiscal year amounted to 3.1 per cent of the gross receipts. Cargo insurance on the Red River is now 0.9

per cent of the value of the goods. On the Mississippi River from Vicksburg to New Orleans cargo insurance is 45 cents per $100, or about 20 cents per bale of cotton, which must be added to the freight rate of 75 cents per bale, thus making the insurance nearly one-third of the freight.

These high and varying rates of insurance not only increase the cost of transportation, but they also indicate the dangers of such traffic and add to the uncertainty and lack of uniformity so detrimental to shippers' interests.

Taxation of Navigation Companies.

The power over interstate and foreign commerce vested in Congress, together with the specific prohibitions of the Constitution against state tonnage and customs duties without the consent of Congress, restricts the taxing power of the States over navigation as such, while leaving the States free to tax vessels like other property within their respective jurisdictions. Thus a tax on interstate freight or passenger traffic as such by the States, is unconstitutional, and the privilege of navigating public waters is not subject to state license tax; but States may, under some conditions, impose franchise taxes upon the gross receipts of transportation companies, even though part of them be derived from interstate traffic, or upon the capital stock of companies engaged in interstate commerce.

Tonnage and Toll Charges.

Tonnage taxes, no matter in what form, may not be imposed by a State on vessels simply because of their

use of or presence on a public waterway, although where a State has made improvements on a waterway it may charge a toll for the use of those improvements in reasonable proportion to the cost and maintenance of such improvements, even if such toll be calculated on tonnage.

Furthermore, a State or municipality may charge wharfage fees for the use of landing places provided by it, even if such fees be fixed on the basis of tonnage.

Methods of State Taxation.

One of the common methods employed in the taxation of navigation companies appears to be an assessment of the capital stock at its market value, after deducting therefrom the assessed valuation of the corporation's vessels and other tangible property which are taxed like similar property belonging to individuals. The States using this method are Massachusetts, North Carolina, Alabama, Kentucky, Illinois, Kansas, Minnesota and North and South Dakota. Several States, however, impose relatively light franchise or license taxes measured by the par value of the stock, and without regard to any taxes assessed upon the tangible property. These States are New Jersey, New York, Maine, Delaware, Ohio, West Virginia, Georgia, Texas, Colorado and California. A number of others tax gross or net receipts as well as the capital stock and tangible property. These States are New York, Pennsylvania, Maryland, Virginia and South Carolina.

Vessels Taxed as Personal Property.

In most of the States water craft of all kinds are assessed and taxed like other personal property, either at the residence of the owners or, what is often the same thing, at the port of enrollment, registry, or license. A few States provide for taxes measured by the gross or net tonnage in lieu of other taxes on such property, on the assumption that the value of vessels is roughly in proportion to size. Vessels engaged in the foreign trade are in several States favored either with exemption from taxation or with very light taxes based upon their net earnings. Massachusetts, which formerly taxed the net earnings or dividends in such cases, now assesses the property, whether belonging to individuals or corporations, at the rate of one-third of 1 per cent—about one-fifth of the rate of taxation on other property. A low rate of taxation on vessel property is probably of advantage to the State imposing it, because of the ease with which taxation can be evaded in respect of property so easily movable.

Nature of Federal Tax.

There is no Federal tax on American vessels in domestic trade. The Government imposes a tonnage tax on vessels entered at ports of the United States from foreign ports, at the rate of 3 cents per ton in the case of vessels from near-by foreign ports, and 6 cents per ton when from more distant places, but not to exceed 15 cents per ton per annum in the former case, or 30 cents per ton per annum in the latter case.

What Constitutes Navigable Water.

In some cases Congress has declared a given stream to be navigable, but the definition of navigability as laid down by the Supreme Court of the United States seems to be the best statement of the law on the subject. In the case of The Daniel Ball, Justice Field said:

"The doctrine of the common law as to the navigability of waters has no application to this country. Here the ebb and flow of the tide do not constitute the usual test as in England, or any test at all of the navigability of waters. There no waters are navigable in fact, or, at least, to any considerable extent, which are not subject to the tide, and from this circumstance tide water and navigable water there signify substantially the same thing. But in this country the case is widely different. Some of our rivers are as navigable for as many hundreds of miles above as they are below the limits of tidewater, and some of them are navigable for great distances by large vessels, which are not even affected by the tide at any point during their entire length. A different test must therefore be applied to determine the navigability of our rivers, and that is found in their navigable capacity. Those waters must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce over which trade and travel are or may be conducted in the customary modes of trade and travel on water."

Nice Distinction in Interpretation.

Thus a stream of sufficient capacity to float logs or timber to market has been held to be navigable in fact. And even though a river before its improvement had contained obstructions to an unbroken navigation, consisting of rapids and falls, yet, inasmuch as a large interstate commerce was successfully carried on over it, in large vessels drawn by animal power, it was held by the Supreme Court to be navigable in fact.

One of the articles of compact in the ordinance of 1787 provided that "all navigable waters leading into the Mississippi and the St. Lawrence and the carrying places between the same, shall be common highways, and forever free, as well to the inhabitants of the said territory as to the citizens of the United States, and those of other States that may be admitted into the Confederacy, without any tax, impost, or duty therefor."

By act of Congress of May 26, 1790, the territory south of the Ohio River was given the privileges of the territory northwest of that river.

The act of May 18, 1796, declared that navigable rivers within public lands were to be deemed public highways. This was followed by the act of March 3, 1803, providing that all navigable rivers within the territory of the United States south of the State of Tennessee were to remain public highways.

The act of March 3, 1811, declared all navigable rivers and waters in Louisiana should remain public highways.

Many States Protect Rivers.

Provisions in the State constitutions deal with the jurisdiction over boundary rivers, the right of free navi-

gation on navigable streams, and restrictions or obstructions to navigation. Thus, the act of Virginia for the erection of Kentucky as a State provided that the use and navigation of the Ohio River within either State should be free, and that each State should have concurrent jurisdiction with the State possessing the opposite shore of the river. The constitution of Tennessee has contained since 1796 a declaration in the bill of rights "that an equal participation in the free navigation of the Mississippi is one of the inherent rights of the citizens of this State."

Constitutional provision as to concurrent jurisdiction over boundary streams are to be found in the constitutions or enabling acts of South Carolina, Kentucky, Indiana, Missouri, Iowa, Wisconsin, Minnesota, Kansas, Nebraska and Orgeon. Provisions in regard to the free navigation of navigable streams are found in the constitutions or enabling acts of South Carolina, Tennessee, Alabama, Missouri, Iowa, Wisconsin, Minnesota, Kansas, Nebraska and Oregon. Similar provisions are found in the statutory codes of Mississippi and Idaho. Some of these refer to all navigable streams, while others mention such important rivers as the Mississippi, the Ohio, the Missouri, and the Columbia, with their tributaries.

The Mississippi River Problem.

The Mississippi River system presents our greatest waterway problem. Its traffic has greatly declined since the building of parallel railroads. Excluding harbor and raft traffic, it was about 20,000,000 tons in 1915, mainly coal, lumber, railroad ties, sand, gravel, oil, cot-

ton, sugar, rice and farm products. But the cotton traffic is surprisingly small, considering the nearness of cotton plantations and cotton markets. The only prosperous exception of importance is the coal traffic downstream. This constitutes about 56 per cent of the entire vessel traffic on the Mississippi system. It is a highly developed long-distance bulk traffic, with the coal produced in enormous quantities directly on the river bank, near the Pittsburg district. It is, however, practically confined to markets immediately along the banks.

Otherwise, the river traffic is in a discouraging state. The great through business of earlier times no longer exists. The traffic history of St. Louis well illustrates this situation. River shipments there in 1890 were over 600,000 tons; in 1915, 93,000 tons. Rail shipments, on the other hand, in 1890 were about 5,000,000 tons; in 1915, 20,000,000 tons.

Situation a Serious One.

The situation in the Mississippi Valley is significant and serious.

There is a vast and growing amount of freight in that valley to be moved both north and south; there has been, and doubtless will be again, extreme traffic congestion there. Even during the severest congestion the Mississippi River got a very small and a decreasing share of the traffic. This condition is highly unsatisfactory.

There are two basic causes: First, the physical conditions, variations in water level and the enormous deposit of sediment; second, the destructive competition by the parallel railroads in general refusing to share

the traffic with the river. Rail competition is a most important factor in water traffic, and some co-operation between railways and waterways seems absolutely necessary to insure a reasonable use of the rivers.

New Orleans as a Gulf Port.

Situated on the Mississippi River, about 100 miles from the Gulf of Mexico, New Orleans possesses commanding advantages as a Gulf port. The port facilities for the handling of cargoes are excellent. Rail lines from the West, Southwest, North and East converge here, and from New Orleans there are regular lines of steamers to Mexico, Central America, Panama, Tampa, Havana, Porto Rico, Baltimore, New York and European ports, besides many tramp vessels, thus affording transportation facilities for all kinds of exports and imports. In the foreign trade New Orleans is an important port of import for the products of Central and South America and the West Indies, including such commodities as coffee, bananas, cocoanuts, pineapples and other tropical fruits, which are shipped through New Orleans to all parts of the United States.

As a port of export New Orleans is also of large importance, particularly in the export of cotton. The excellent river and rail facilities from many parts of the South make New Orleans the port of export for the cotton grown in a considerable portion of the southern territory. In the export of grain New Orleans also enjoys an extensive trade. Large elevators have been erected by railroads along the river front, from which shipments are made to European, West Indian and Central and South American ports.

Large Coastwise Traffic.

Of the coastwise steamship traffic at New Orleans the most important is that to and from New York, including Pacific coast traffic over Southern Pacific lines. From New Orleans to New York the cargoes are made up of cotton, rice, citrus fruits and other agricultural products, lumber, sugar, molasses, wines, liquors, salt and rubber. From New York the shipments consist of general merchandise, machinery, iron and steel products, wire, building materials, cordage, bagging, etc. A line between New Orleans and Baltimore began operations in the summer of 1907 as an experiment. The ships of this line carry freight exclusively, consisting of canned goods, southbound; and rice, sugar, lumber and merchandise, northbound. A steamship line also runs between New Orleans and Tampa, Fla., touching at Mobile, Ala., and Carrabelle, Fla. The westbound cargoes of the line consist of phosphate rock; the eastbound cargoes are of a miscellaneous nature, including flour, grits, canned goods, wine, salt, lard, rice, sugar and other commodities of a similar character.

Commerce on the Great Lakes.

The principal characteristics of lake commerce are the preponderance of eastbound over westbound shipments, and the fact that the traffic is mainly in a few commodities—iron ore, grain, coal and lumber. There is a considerable movement of miscellaneous and package freight, both local and through, but it is small compared with the enormous bulk-freight traffic in the crude products of contiguous mines, forests and grain fields.

Through traffic constitutes the greater part of the total freight movement. The main course of this lies between the western extremity of Lake Superior and the southern shore of Lake Erie.

Lake traffic was not reported as a whole prior to 1889, when, according to the census, the domestic traffic amounted to 25,266,974 net tons. The domestic traffic amounted to 45,000,000 tons in 1901, and in 1915 to approximately 100,000,000 tons on the Great Lakes and St. Lawrence River.

Nature of the Traffic.

Iron ore and coal form by far the greater part of the lake traffic, and furnish together 98 per cent of the total increase from 1905 to 1915. The movement of lumber during these years has declined in importance; other traffic has remained about stationary; except the movement of package and miscellaneous freight, which has increased.

Since 1890, with the development of the Lake Superior mines, the United States has taken first rank among the world's iron producers. Of the total domestic production of iron ore, approximately 80 per cent was transported by way of the Great Lakes (41,000,000 net tons in 1906, and 54,500,000 net tons in 1915), constituting in some years more than half of the total domestic lake traffic.

Next in volume to iron ore, and first in the westbound lake traffic, is the movement of coal. This was over 24,000,000 tons in 1915, representing about a fourth of the domestic lake traffic.

In the movement of flour and grain (eastbound) there is active competition between the lake and all-rail routes, and with the decline in export trade the domestic movement on the lakes has declined to some extent in recent years, to about 150,000,000 bushels of grain and 1,000,000 tons of flour in 1914. There has been an increase of traffic from American ports to Canada and also between Canadian ports.

Coastwise Traffic Conditions.

Development of railroads and the decline of canals has not prevented the continuous growth of a large movement of traffic by water along the coasts, bays and sounds, and to some extent on the tidal streams of the Atlantic and Gulf territory. This traffic includes the movement of coal from points in New York, New Jersey, Pennsylvania, Maryland and Virginia to various New England and southern ports; the movement of raw material, including cotton, lumber, naval stores and oil, from South Atlantic and Gulf ports to northern ports in exchange for manufactured and imported articles, as well as for ice and coal; the interchange of merchandise between the ports of New York, Philadelphia and Baltimore and New England ports, and between the principal North Atlantic ports and the South Atlantic and Gulf ports.

The Four Principal Ports.

Of the many Atlantic ports, four, sometimes called "the Atlantic portals," stand out conspicuously, namely, Boston, New York, Philadelphia and Baltimore. Each of these is the distributing point for an important area

of the country, and also the terminal of important lines of railroad connecting the largest grain-producing sections of the United States with the seaboard, thus making each such port a way station for the grain exported from the United States to other countries and giving rise to the well-known port differential system of rail rates.

Other ports of importance are Portland, Providence, Wilmington (Del.), Norfolk, Wilmington (N. C.), Charleston, Savannah, Jacksonville, Mobile, New Orleans and Galveston.

At these and other less prominent ports on the Atlantic and Gulf coasts a high degree of specialization has developed in the coastwise trade. Coal is shipped mainly from a few ports in the Middle Atlantic States, lumber and naval stores from the South Atlantic ports, cotton and phosphate from certain South Atlantic and Gulf ports, and petroleum from a few ports of the Gulf and North Atlantic coasts.

Total Shipments and Receipts in American Vessels at Atlantic and Gulf Ports for One Year.

Port.	Shipments. Net tons.	Receipts Net tons.
Bangor, Me	255,613	319,546
Rockland, Me	175,904	149,496
Portland, Me	303,295	1,357,316
Portsmouth, N. H	25,390	362,820
Boston, Mass	887,001	6,533,573
New Bedford, Mass	163,951	581,176
Fall River, Mass	274,646	786,392
Providence, R. I	341,524	2,749,511
New London, Conn	240,305	887,404
New Haven, Conn	161,666	2,156,814
New York, N. Y	8,598,374	17,507,906
Ports adjacent to New York Harbor *a*	5,052,847	929,836
Philadelphia, Pa	5,213,485	2,721,456
Wilmington, Del	95,241	250,188
Baltimore, Md	3,579,407	1,858,443
Washington, D. C	92,910	599,177

Port.	Shipments. Net tons.	Net tons. Receipts.
Norfolk and Newport News, Va	7,680,230	2,808,346
Wilmington, N. C	121,930	145,209
Charleston, S. C	303,950	414,730
Savannah, Ga	907,397	582,966
Jacksonville, Fla	661,615	331,951
Tampa and Port Tampa, Fla	372,467	188,692
Pensacola, Fla	56,130	123,632
Mobile, Ala	260,725	102,533
Gulfport, Miss	48,061	346,096
New Orleans, La	741,621	1,182,863
Port Arthur, Tex	1,052,778	39,363
Galveston, Tex	734,915	960,982
Other ports *b*	26,957,580	18,382,541
Total *b*	65,360,958	65,360,958

a Jersey City, Hoboken, Newark, Perth Amboy, and South Amboy.

b Includes traffic in American vessels at Atlantic and Gulf ports from and to ports not on the Atlantic and Gulf coasts, amounting to: Shipments, 1,587,789 tons; receipts, 2,340,843 tons.

Handicaps of River Traffic.

The commerce of the rivers has not kept pace with the general industrial development of the Central West. The reason for this is not far to seek. The building and competition of railroads and the limitations imposed by the physical characteristics of the rivers have been the chief causes that have contributed to the decline of river traffic. When the railroads began operations, the transportation of passengers, mail, and the higher grades of freight demanding expeditious handling were taken over from the boat lines, until today practically the only traffic left to the river is that of package freight and farm products between local river points and the long-distance movement of coal and other crude products of relatively cheap cost.

Trouble with Water Levels.

Boat lines are handicapped to a great extent in their competition with railcarriers by the unreliability in the

depth of water in the rivers, causing at times a practical suspension of traffic. This irregularity in the stages of the rivers frequently entails heavy expense, due to the cost of holding cargoes on river craft to await navigable stages. Then, too, during the winter season the northern rivers are closed by ice for several months. Changes in level, often exceeding 20 or 30 feet on the Mississippi, also make the question of terminals very difficult. This unreliability of the rivers has led many of the larger shippers along the river to provide for rail shipments only. Railroads have been more readily adapted to the increasing demands of commerce. Heavier rails have been laid, rolling stock of larger capacity has been added, locomotives of greater power have been put in service, and the constructive and administrative sides of railroading have been brought to a high state of excellence. These improvements, adapted to the changing needs of commerce, have resulted disastrously to the boat lines.

One Source of Wonder.

Contrasted with these changes, the improvement in facilities offered by the river carriers have been slight. The river steamboat of today is practically the steamboat of half a century ago. This is true also of their terminals and the systems of loading and unloading. The tendency of commerce has been toward a movement by carriers of greater and greater capacity, and in this respect the river-boat lines could not adequately meet requirements, because increased carrying capacity meant increased draft of the boats and barges, and improvement in this direction proved impracticable, since

the draft of the river craft early reached the greatest depth practicable for navigation on the rivers, on which, generally, no systematic efforts were undertaken to secure and maintain greater depths of water. The river boats have been restricted also to the movement of freight between river points only; thus they could not hold their own on competitive business with railroads, which could recoup losses on competitive business by increased charges at noncompetitive points. Moreover, all river business is naturally competitive among the boat lines themselves, while a very great proportion of the railroad traffic is not subject to competition. In fine, the remarkable feature of river transportation, not only on the system of rivers in the Mississippi Valley but also on practically all the rivers of the country, is not the small amount of freight now moving over the rivers, but the fact that the river lines carry the volume of traffic they do under the existing conditions.

On the Pacific Coast.

The four leading ports on the Pacific are San Francisco, Cal., Portland, Ore., and Seattle and Tacoma, Wash. Of these, San Francisco overshadows in importance its three rivals, occupying on the Pacific, with reference to water routes and commerce, a commanding position comparable to that of New York on the Atlantic. Each of the four important Pacific ports is the center of numerous water routes, which, in connection with transcontinental and local lines of railroad, assume a more or less dominant place respecting the traffic peculiar to the territory adjacent to such port. Other Pacific ports of importance are Grays Harbor and

Humboldt Bay, for lumber shipments; Port Harford, in San Luis Obispo Bay, for petroleum shipments; the ports of Los Angeles and San Diego.

The latest census report on transportation by water shows freight shipments in American vessels from San Francisco of 1,656,614 tons, from Portland of 492,573 tons, from Seattle of 856,988 tons, and from Tacoma of 270,256 tons. San Francisco shipments were 12.5 per cent of the total shipments in American vessels on the Pacific coast, and for those four ports were a fourth of the total. Foreign trade is a larger proportion of the traffic in American vessels on the Pacific coast than on the Atlantic coast.

Lumber the Most Important Item.

Lumber constitutes the most important article in the Pacific trade. Stone, sand, etc., are next in volume. Petroleum and other oils are third in volume and one of the most important articles of water-borne traffic in this section. There is a considerable movement of grain and other agricultural products. Coal is of minor importance.

In several respects certain peculiarities connected with the water-borne traffic of this territory afford interesting contrasts to similar movements on the Great Lakes and Atlantic coast. This is especially true of the movements of the products of forests, including logs and lumber, which represent in point of volume by far the most important commodities shipped by water in this territory.

Early in the year 1907 many of the lumber-carrying vessels engaged in the Pacific coast trade were laid by,

owing to a shrinkage in the demand for lumber. Prices for carrying from Puget Sound and way ports to San Francisco dropped from $10.50 to $5.50 per thousand feet during the spring. This was attributed to the diminution in demand, but was perhaps due in some measure to the breaking up of combinations following the passage of the California anti-trust law, known as the "Cartwright law."

The assistant manager of a large lumber company at San Francisco attributed the depression in charter rates for carrying lumber partly to car shortage for Eastern shipment in the early part of 1907 and illustrated his remarks as follows: He thought that there was a great deal of lumber put into San Francisco and along the coast because of the car shortage, claiming that a great many mills that had been shipping lumber East were naturally forced to put their lumber into San Francisco.

An Unusual Shipment of Lumber.

An unusual feature of the lumber trade that year was the shipment of a consignment of timber from Tacoma to Chicago by water to San Pedro and thence east over the Santa Fe Railway to Chicago. The shippers could not take chances with the slow movement of lumber by the northern transcontinental railroads, and although the route involved an excess journey of over 1,600 miles, both shipper and consignee found the routing advantageous in the saving of time effected.

Large Shipments of Crude Oil.

Several pipe lines have been constructed in southern California from oil fields, but the greater proportion of

long-distance transportation of crude oil in that State is still by rail or water. Transportation by water is an important movement for several reasons. Most of the oil fields are comparatively near the coast, and the crude oil is brought to the shipping ports by pipe lines for shipment to the refineries at Point Richmond, on San Pablo Bay near San Francisco. Shipments are also made from the refineries to the consuming markets, many of which are seaports. Much of the oil is not refined, but is used for fuel purposes; and this brings the business into close relation with steam navigation on account of the scarcity of coal. Several of the oil companies have established a business in fuel oil in Hawaii, as well as in Washington and British Columbia, in competition with coal.

The principal oil-shipping ports are Ventura, Alcatraz, Port Harford, Monterey and Point Richmond. Oil is shipped coastwise from these ports both in barrels and in cases, but the greater part of the movement on the Pacific coast, as elsewhere, appears to be in tank steamers or tank barges, from which oil is delivered at the seaport towns for local consumption or for reshipment to the interior. The export movement of petroleum is also chiefly in tank steamers.

Specimen of Sailing Charter.

This charter party, made and concluded upon in the city of ————, the —— day of ————, 18——, between ———— ————, of the ————, of ————, of the burthen of —— tons or thereabouts, register measurement, now lying in the harbor of ————, of the first part, and ————, of the second part, witnesseth, that the said party of the first part agrees in the freighting and chartering of the whole of the said vessel, including deck (with the exception of the cabin ———— and necessary room for the crew and storage of provisions and sails), unto said party of the second part, for the voyage from ————, on the terms following: The said vessel shall be tight, staunch, strong, and in every way fitted for

such a voyage, and receive on board during the aforesaid voyage the merchandise hereinafter mentioned, including specie, and no goods or merchandise shall be laden on board otherwise than from said parties of the second part, or their agents. The said party of the second part doth engage to provide and furnish to the said vessel ————, the bills of lading to be signed without prejudice to this charter, and to pay to said party of the first part, or agent, for the use of said vessel during the voyage aforesaid ————.

It is agreed that the lay days for loading and discharging shall be as follows (if not sooner despatched), commencing from the time the vessel is ready to receive or discharge cargo: ————, and that for each and every day's detention by default of the said party of the second part, or agent, ———— dollars per day, day by day, shall be paid by said party of the second part, or agent, to the said party of the first part or agent. The cargo or cargoes to be received and delivered alongside, within reach of the vessel's tackles. ————, the dangers of the seas and navigation of every nature and kind always mutually excepted.

A commission of —— per cent upon gross amount of this charter, payable by the vessel, due ————, on the signing thereof.

To the true and faithful performance of all and every of the foregoing agreements we, the said parties, do hereby bind ourselves, our heirs, executors, administrators, and assigns, and also the said vessel's freight, tackle, and appurtenances, and the merchandise to be laden on board, each to the other in the penal sum of ————.

In witness whereof, we hereunto set our hands the day and year first above written.

[Blank spaces for signatures.]

Time Charter Party for Great Lakes.

CHICAGO, ———— ——, 190—.

Charter party made and entered into this ———— day of ———— by and between ———— of ————, owners of the steamer ———— and tow barges ———— and ————, of ————, their agents, parties of the first part, and ————, of ————, party of the second part, witnesseth:

First. That for and in consideration of the money to be paid as hereinafter provided, and in consideration of the performance of the conditions hereinafter named to be kept and performed by the parties hereto, the said party of the first part charters and lets the steamer ———— and tow barges ———— to the party of the second part for the season of navigation of the year 19—, beginning with April 10th, 19—, or as soon as navigation is opened, and ending November 30th, 19—, on the barges ————, or as soon as possible thereafter provided boats are on an unfinished voyage, and ending when navigation is closed and it is unsafe on account of ice and weather to further operate said steamer ————.

Second. The party of the first part agrees to fit out properly and prepare said steamer and tow barges for said season of navigation and warrant the same to be in good condition and seaworthy for a period of said term, and to deliver the said boats to party of the second part at ————, about April 10th, 19—, or as soon as navigation is opened.

Third. The party of the first part agrees, at its own expense, to insure the said vessels against marine perils and fire and also including the damages by collision caused by said vessels or either of them, and the party of the second part shall bear one-half the cost of all repairs to the engine, boiler, machinery, and hull of the said steamer ———— and the barges

———— that are not covered or insured under the best and most favorable form of marine and fire insurance policies that can be obtained upon said vessels. In all cases the money obtained from the insurance companies shall be applied on said repairs covered by such insurance.

Fourth. The party of the first part shall not be compelled to insure the said vessels, but in case they do not they shall assume the same liability as any insurance company would have assumed under the best and most favorable policy that the party of the first part could have obtained upon the said steamer and barges.

Fifth. The party of the second part hereby agrees to run and navigate the said vessels, man and victual them at their own proper expense, and keep them at all times in good condition, and promptly pay such bills of expenses and operating and repairing said boats as are proper for them to pay under this charter party.

Sixth. The party of the second part shall be entitled to receive and collect all the said steamer's and tow barges' freights and earnings and profits of every kind during the term of this charter party, and shall at the end of the term return the said steamer and tow barges to the said party of the first part at ————, free and clear of all debts and incumbrances incurred by them under this charter party and in as good order and condition as when received, ordinary wear and tear only excepted.

Seventh. The party of the second part agrees to pay to the party of the first part, through ————, their agents, the sum of ———— dollars for the use of the said steamer and tow barges as follows: ———— dollars on the first days of May, June, July, August, September, October, and November, and the further sum of ———— dollars at the end of the term of this charter party.

Eighth. It is further agreed that the party of the first part, with the consent of the party of the second part, shall nominate and appoint the masters and engineers of said vessel.

Ninth. It is further agreed that in case of disaster to said steamer or either one of said barges, which will take the said steamer or either one of said barges out of commission for a period of time longer than five days, then and in that case for the period beyond said five days there shall be a reduction of the charter price pro rata for the time thus used, until said boat or boats shall again go into commission.

Tenth. In case of the total or constructively total loss of the said steamer ———— this charter party shall be at an end, and compensation to be paid upon such proportion of the time as the boats actually navigate.

Eleventh. For the purpose of fixing compensation in case of loss of one or both barges, the ———— dollars to be paid under this charter party is to be considered as paying ———— dollars for the steamer ————; ———— dollars for the barge ————, and ———— dollars for the barge ————. In case of loss of either or both barges (———— or ————) proportion of the above sums are to be paid as the boat or boats actually navigate under the conditions of this charter party. And the remaining boats are to be continued in the service of the party of the second part, as if no accident had happened.

In witness whereof the parties have hereunto set their hands this day and year first above written.

[Blank spaces for signatures.]

Memorandum of Pacific Charter.

SEATTLE, WASHINGTON, *April 23, 19* .

Vessel: American steamer ———— .

Tonnage: ———— register.

Present location: Seattle, Washington.

Duration: One voyage from Puget Sound to San Francisco with option of two (2) voyages, said option to be declared before vessel sails from Puget Sound on the first voyage.

Basis: Government form charter. Operators paying for usual insurance, upkeep, wages, and subsistence of crew, charterers to pay cost for port charges including stevedoring and trimming of cargo and customary overtime for crew working cargo, extra insurance, and extra crew required over and above ship's regular certificate.

Delivery and redelivery to be made at Seattle, Washington.

Rate: ———— dollars daily.

Charter money payalle at Seattle on completion of each round voyage.

Miscellaneous: Operators guarantee steamer's fuel consumption will not exceed twenty-two tons daily Black Diamond under ordinary conditions, and that ship will carry three thousand three hundred gross tons (3,300) cargo coal if same is properly stowed. The owners shall not be liable for loss or damage occasioned by fire from any cause, or wherever occurring; by barratry of the master or crew; by robbers or thieves, by arrest and restraint of princes, rulers, or people, riots, strikes, or stoppage of labor; by explosion, bursting of boilers, leakage of steam or water pipes, breakage of shafts, or any latent defect in hull, machinery, or appurtenances; or unseaworthiness of the vessel, even existing at the time of shipment, or sailing on the voyage, providing the owners have exercised due diligence to make the vessel seaworthy.

[Blank spaces for signatures.]

[Here insert charter party.]

SAN FRANCISCO, ———— ——, 19 —.

It is this day mutually agreed between ———, agents for owners of the steamship or vessel called the ———, of ———— tons gross register, and ———— tons net register, classed ————, and guaranteed to carry ———— tons dead weight of cargo and fuel, inclusive, on Lloyd's summer freeboard, now ————, and ————, of San Francisco, merchants and charterers, for the term of ———— calendar months certain, the charterers having the option of continuing the charter for a further period of ———— calendar months, more or less, at the option of the charterers, they giving the owners one month's notice previous to redelivery of the vessel. The hire to commence from the day on which she is delivered or placed at the disposal of the charterers (but not before ————, if required), at Nanaimo, B. C., in such dock or such safe wharf or place (where she may always safely lie afloat), as charterers may direct, she being then ready with clear holds, tight, staunch, strong, and every way fitted for the service (and with full complement of officers, seamen, engineers, and firemen for a vessel of her tonnage); to be employed to carry coal between British Columbia and San Francisco, on the following conditions:

That the owners shall provide and pay for all provisions and consular, shipping, and discharging fees of the captain, officers, engineers, firemen, and crew, and shall pay all wages of the captain, officers, engineers, firemen, and crew; shall pay for the insurance on the vessel; also for all deck, galley,

and engine-room stores, bunker coal excepted, and maintain her in a thoroughly efficient state in hull and machinery for the service.

That the charterers shall provide and pay for all bunker coals, port, light and dock charges, pilotages, agencies, consular charges (except those pertaining to the captain, officers, or crew), commissions, labourage, Suez and other canal dues when incurred, also all charges appertaining to the cargoes they may put on board.

That the charterers shall accept and pay for all coal in ship's bunkers upon commencement of hire; and the owners shall on expiry of this charter party, pay for all coal then left in the bunkers at current market prices of the port where the hire begins and ends.

That the charterers shall furnish all coal cargo that may be required by captain, and shall pay for the use and hire of the said vessel at and after the rate of ———— sterling per ton of 2,240 lbs. per calendar month on actual outturn of coal cargo as ascertained by United States customs weights.

Payments to be made in cash in advance monthly, commencing on the day of delivery as aforesaid; hire to continue from the time specified for terminating the charter until her redelivery to owners (unless lost) at San Francisco and to be payable in San Francisco or at owner's option by telegraphic transfer on London at their expense.

The monthly settlements to be on basis of ———— tons cargo delivery and an adjustment to be made quarterly on average outturn of cargo.

Captain to take on board at loading port sufficient bunker coal for the round voyage between British Columbia and San Francisco.

Charterers have the option of employing vessel in other lawful trades, in which event the monthly rate of freight payment to be made as if she was employed between British Columbia and San Francisco, it being calculated on D. W. capacity less bunkers required on a voyage from Nanaimo to San Francisco and return, computed as usual hitherto; if employed north of 51° on west coast of North America or north of 46° on Siberian coast, charterers to pay extra insurance on vessel.

Should the vessel be on a voyage occupying more time than herein stipulated, the rate of hire for such additional period to be in the same proportion as above, and if redelivered with owner's consent before the expiration of the time stipulated a corresponding rebate of hire to be allowed.

Typical Bill of Lading.

Received, in apparent good order and condition, by S. S. ———— from ————, to be transported by the good steamship ———— now lying in the port of ———— and bound for ————, ———— gallons crude petroleum in bulk, being marked and numbered as per margin (weight, quality, contents, and value unknown), and to be delivered in like good order and condition at the port of ———— unto ———— or to his or their assigns, he or they paying freight on the said goods on discharge in accordance with charter party made abroad and observing all other conditions as mentioned therein. General average payable according to York-Antwerp rules.

It is mutually agreed that the ship shall have liberty to sail without pilots; to tow and assist vessels in distress; to deviate for the purpose of saving life or property; that the carrier shall have liberty to convey goods in lighters to and from the ship at the risk of the owners of the goods; and, in case the ship shall put into a port of refuge, or be prevented from any cause from proceeding in the ordinary course of her voyage, to tranship the goods to their destination by any other steamship.

It is also mutually agreed that the carrier shall not be liable for loss or damage occasioned by causes beyond his control, by the perils of the sea, or other waters, by fire from any cause or wheresoever occurring; by barratry of the master or crew, by enemies, pirates, or robbers, by arrest and restraint of princes, rulers, or people, riots, strikes, or stoppage of labor; by explosion, bursting of boilers, breakage of shafts, or any latent defect in hull, machinery, or appurtenances; by collisions, stranding, or other accidents of navigation of whatsoever kind (even when occasioned by the negligence, default, or error in judgment of the pilot, master, mariners, or other servants of the shipowner not resulting, however, in any case, from want of due diligence by the owners of the ship or any of them, or by the ship's husband or manager); nor for heating, decay, putrefaction, rust, sweat, change of character, drainage, leakage, breakage, or any loss or damage arising from the nature of the goods or the insufficiency of packages; nor for land damage; nor for the obliteration, errors, insufficiency or absence of marks, numbers, address or description; nor for risk of craft, hulk, or transhipment; nor for any loss or damage caused by the prolongation of the voyage.

1. It is also mutually agreed that the carrier shall not be liable for gold, silver, bullion, specie, documents, jewelry, pictures, embroideries, works of art, silks, furs, china, porcelain, watches, clocks, or for goods of any description which are above the value of $500 per package, unless bills of lading are signed therefor, with the value therein expressed, and a special agreement is made.

2. Also, that shippers shall be liable for any loss or damage to ship or cargo caused by inflammable, explosive, or dangerous goods shipped without full disclosure of their nature, whether such shipper be principal or agent; and such goods may be thrown overboard or destroyed at any time without compensation.

3. Also, that the carrier shall have a lien on the goods for all fines or damages which the ship or cargo may incur or suffer by reason of the incorrect or insufficient marking of packages or description of their contents.

4. Also, that in case the ship shall be prevented from reaching her destination by quarantine, the carrier may discharge the goods into any depot or lazaretto, and such discharge shall be deemed a final delivery under this contract, and all the expenses thereby incurred on the goods shall be a lien thereon.

5. Also, that if the goods be not taken by the consignee, within such time as is provided by the regulations of the port of discharge, they may be stored by the carrier at the expense and risk of their owners.

6. Also, that full freight is payable on damaged goods; but no freight is due on any increase in bulk or weight caused by the absorption of water during the voyage.

7. Also, that if on a sale of the goods at destination, for freight and charges, the proceeds fail to cover said freight and charges, the carrier shall be entitled to recover the difference from the shipper.

8. Also, that in the event of claims for short delivery when the ship reaches her destination, the price shall be the market price at the port of destination on the day of the ship's entry at the custom-house, less all charges saved.

And finally, in accepting this bill of lading, the shipper, owner, and consignee of the goods and the holder of the bill of lading agree to be bound by all of its stipulations, exceptions, and conditions, whether written or printed, as fully as if they were all signed by such shipper, owner, consignee, or holder.

In witness whereof, the master or agent of the said ship hath affirmed to ——— ——— bills of lading, all of this tenor and date, numbered consecutively, one of which being accomplished, and given up to the carrier, the others to stand void.

Hours occupied in loading, ———.

Dated in ——— this ——— day of ———, 19—.

Specimen of Ship Manifest.

Cleared by ———. Manifest of the whole cargo on board the ———, ——— master. Burthen, ——— tons. Navigated by ——— men, ——— boys. Bound from the port of ——— for ———.

Marks and Nos.	No. of Entries	Packages and contents	Shipper.	Residence.	Consignee.	R'sid'nce
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....

[On back of manifest.]

I, ———, master of the ———, do solemnly swear to the truth of the annexed manifest, and that, to the best of my knowledge and belief, all the goods, wares, and merchandise of foreign growth and manufacture therein contained were legally imported, and the duties thereon paid or secured. So help me God.

——— ———.

Sworn to this ——— day of ———, 19 —.

——— ———, *Deputy Collector.*

DISTRICT AND PORT OF ———.

———, master of the ———, of ———, having sworn as the law directs to the annexed manifest, consisting of ——— articles of entry, and delivered duplicates thereof, permission is hereby granted to the said to proceed to the port of ———, in the State of ———.

Given under my hand, at ———, this ——— day of ———, 19 —.

——— ———, *Deputy Collector.*

——— ———, *Naval Officer.*

CHAPTER XIX.

LAKES-TO-THE-GULF WATERWAY.

No discussion of the water or rail-and-water feature of transportation would be complete without extended mention of what is being done in the way of securing a deep waterway connecting the Great Lakes with the Gulf of Mexico; and why this work is advocated by heavy shippers. It should be borne in mind that the Drainage Canal, completed a few years ago at Chicago, is, as the name indicates, solely a sanitary work. It is proposed to utilize the channel of this canal in connection with the proposed waterway; but they are two separate and distinct works, one purely local and sanitary in its nature, the other a national undertaking in the interest of commerce.

Why a Waterway Is Needed.

In urging the completion of this latter work Mr. E. S. Conway, Chairman of the Deep Waterway Committee of the Chicago Association of Commerce, very properly calls attention to the great productive resources of the Middle West, and the necessity of economical transportation in getting these products to market—a competitive means of transportation that will not only ensure cheaper rates on products that are now being moved, but will make possible the moving of other commodities which are now practically unsalable abroad be-

cause the lowest obtainable rates of carriage are still practically prohibitive.

Production of Middle West.

The latest obtainable official statistics show that in 1914 the Central or Middle West contained more than one-half of the wealth invested in improved farms in the United States; it had more than one-half of the livestock, and it produced 78 per cent of the food products. In the same region was produced more than one-half of the butter, corn, wheat, oats, barley, rye, flaxseed, potatoes, broom corn and poultry raised in this country. This was the condition in 1914; the showing of the Middle West is even greater now.

The following table shows the chief products of the farms in the United States and the percentage of each that is grown in the Middle West:

	United States.	Middle West.	Per Ct.
Number of farms	5,739,657	2,196,567	38
Value of improved farms	16,674,690,438	9,563,880,438	57
Value of live stock	3,078,050,041	1,576,977,350	58
Value of farm property	20,514,001,838	11,504,919,848	51
Value of farm products	4,739,118,752	2,360,011,670	49
Value of farm neat cattle	1,476,499,714	257,903,887	16
Value of products per farm	826	1,074	—
Value of poultry	85,794,996	43,416,629	56
Butter, lbs.	1,491,871,673	810,841,697	54
Cheese, lbs.	298,344,654	133,964,093	45
Wool, lbs.	276,991,812	73,909,116	26
Corn, bushels	2,666,440,279	1,941,220,100	73
Wheat, bushels	658,534,252	441,300,918	67
Oats, bushels	943,389,375	764,279,166	89
Barley, bushels	119,634,877	81,560,497	68
Rye, bushels	25,568,625	25,568,625	63
Flax seed, bushels	19,979,492	19,797,647	99.9
Hay, tons	84,010,915	48,988,418	58
Potatoes, bushels	273,318,167	141,800,447	52
Tobacco, lbs.	868,112,865	123,201,591	14.2
Broom corn, lbs.	90,947,370	81,264,590	80
Orchard products, value	83,751,840	24,376,534	21

Great Growth of Manufactures.

While the Middle West is regarded as distinctively an agricultural district it has, within the last twenty years, assumed an importance as a manufacturing center that has placed it in advance of most of the other geographical divisions of the United States. The following table gives data as to the industrial energies of both the United States and Middle West, with the percentages of each that belong to the latter:

	United States.	Middle West.	Per Ct.
Number of Establishments	512,191	182,467	35.62
Capital	$ 9,831,486,500	$ 2,902,008,108	29.41
Wage Earners	5,314,539	1,537,301	28.10
Wages	2,327,295,545	687,980,264	29.56
Cost of material	7,346,358,979	2,545,673,693	34.66
Value of product	13,000,149,159	4,338,351,840	33.37

Lack of Transportation Facilities.

Unexampled as has been the industrial and commercial advancement of this part of the country its progress has been seriously impeded by lack of cheaper transportation. The Eastern, Southern and Western divisions of the Union are near tide water, to which they are easily accessible both by rail and water transportation, but the heart of the continent, the Central West, is from 500 to 1,500 miles from the ocean, and it is forced to depend chiefly upon railways as the medium for the conveyance of its bulky and inexpensive products, many of them exceedingly sensitive to charges for transportation, to oceanic ports for transshipment to the foreign markets of the world or to reach those sections of our own country where the consumption of agricultural commodities far exceeds local production.

Heavy Tax Upon Producers.

Varying inequalities and extraordinary conditions have imposed many heavy burdens upon farmer, manufacturer and laborer in the Central West, to which they have loyally submitted, hoping that the injustice of which they had just reason to complain would be recognized and corrected. The Central West is abundantly supplied with natural water courses which require only a small outlay of money to enable ocean vessels to receive and discharge their cargoes at inland ports. By deepening and straightening the Upper Mississippi, the improvement of the Illinois River and connecting that stream with the Great Lakes, the Great Middle West would be linked with the Atlantic and Gulf ports. Upon the completion of the Panama canal it would be within direct communication with the cities of the Pacific coast as well as with those of Hawaii, the Philippines, Japan, China and Western South America. The saving of distance between Chicago and San Francisco and Asiatic ports, via the Mississippi River and the Panama Canal, over the old route around South America and through the straits of Magellan, would be between 8,700 and 8,946 miles.

Improvement of Stream Urged.

For the last sixty years, and especially since the close of the Civil war, the demands for the improvement of that stream, and its navigable affluents, have been urgent and universal. The greater cost to the shipper in the carriage of heavy and bulky products by rail than by water is so marked as to emphasize the present popular demand for the rehabilitation and improvement of the

practically abandoned water courses, so that they may be used not only to carry the largely increased volume of domestic production, but also that they may hold in check the carrying charges by rail which in many instances are so high as to prove a serious restraint upon the productive energies of the people.

Water Transportation Cheapest.

The history of commerce in every country on the globe proves that navigable waterways not only afford shippers the cheapest possible means for the carriage of freight, but they also regulate all charges for its transportation in their vicinity. The cost to the shipper per ton-mile for moving freight by rail varies somewhat according to cost of construction, grades, curves, etc., of different roads, but in this country such cost is included between 6 and 8.58 mills, the average of all the roads in the United States being 7.5 mills per ton per mile. On the other hand, the cost of that service by water varies from .92 of a mill, on the Great Lakes, to .1 of a mill on the Ohio and Lower Mississippi Rivers. A condition clearly illustrative of the importance of water transportation, as compared with conveyance by rail when coarse products are involved, is at hand at our own doors. Fully seven-tenths of all the iron ore mined in the United States is obtained from the extensive ore fields of Michigan, Wisconsin and Minnesota, those deposits being made accessible to the coal beds of Illinois, Ohio and Pennsylvania by cheap water transportation on the Great Lakes. The result is that ore and fuel, brought together at a small cost of transportation, has

given, not only the Middle West, but the entire country, cheap pig iron and steel which are fundamental in all considerations involving diversified and profitable industry. This is why the States of Illinois, Ohio and Pennsylvania make nearly all the iron and steel that are produced in the United States, while their cities are typical industrial centers as to the variety and volume of those manufactured goods of which iron and steel form the principal factors.

Examples of Water Charges.

On the Erie Canal the cost of transportation is 1.9 mills, but upon the deepening of that waterway to 12 feet the expense will be reduced to, approximately, half a mill. Col. John L. Vance, President of the Ohio River Improvement Association, said in an address recently delivered that "the heavier freight—coal, iron, steel, locomotives—are today carried on the Ohio and the Lower Mississippi for one-third of a mill per ton per mile—a less figure than on any other waterway in the world. This figure includes the return of empties, and leaves a handsome profit to the transportation lines."

As an example of cheap transportation on the Ohio and Mississippi the steamer Sprague may be cited. She has handled safely, in one tow, 70,000 tons of freight in barges. With the most approved railway appliances in use at the present time this would require 2,333 cars —making a train fifteen miles long, not including the locomotives required to move these cars. Cotton is shipped by rail from Dallas, Texas, to tide water at Galveston, a distance of 300 miles, at a freight charge of $3 a bale, while from Lake Providence, La., to New Or-

leans the freight charge by water is 50 cents a bale for exactly the same distance. The rate on coal from Pittsburg to Lake Erie, 135 miles by rail, is 90 cents a ton, while iron ore is carried from the Mesaba mines on Lake Superior to Ashtabula, Ohio, by water, a distance of 1,000 miles, for from 75 to 80 cents a ton. Cargoes of coal are carried back, on the return trip, in the same vessels for 35 cents a ton.

Bulky Goods Suffer Most.

These indisputable facts demonstrate the decided advantage that exists in the cost of carriage of coarse freight by water over that by rail. The effect of cheap transportation is easily illustrated. Take a bale of cotton, at ten cents a pound, and it is worth $50. It will take 63 bushels of wheat at 80 cents a bushel or 100 bushels of corn at 50 cents a bushel, to bring as much money in the market as the cotton will bring. The cotton will weigh 500 pounds; the wheat 3,700 pounds and the corn 7,000 pounds. In other words it costs more than seven times as much to transport a dollar's worth of wheat, or fourteen times as much to carry a dollar's worth of corn to market as it does to ship a dollar's worth of cotton, the rate being the same. The very marked disproportion in the weight and bulk shows why the Western farmer is so insistent upon cheaper methods of carrying his bulky products to market than those offered by railroads.

Competition Brings More Business.

Advocates of waterways say the fear that canals may supersede the railroads is not only groundless but it has

been established as a fact that where railroads and canals compete as common carriers the result has invariably been that the tonnage of the former has been largely increased. The waterway through the Great Lakes made Chicago the greatest railway center in the world. The barge has not superseded the freight car. Both these means of conveying freight are thriving, not only around the Great Lakes but also along all the great water courses and the Atlantic sea coast. The waterway furnishes the more economical means for carrying the slow and bulky products of the forest, mines, farms and furnaces; the railroads provide the most rapid means for transporting the costly and finished products of the loom, mill and factory.

Effect of Water Competition.

The two are, however, competitors within certain well defined limits. The waterway does oblige railroads to lower their rates on all classes of freight. For instance, this condition recently existed in Chicago. The Canadian railroads were competing with the Dominion canals in the carrying of grain from Chicago to Montreal, and made a rate of 3½ cents a bushel. The American rate was and remained 7 cents a bushel by rail. The reason for this is that the Canadian canals made a low rate which the Canadian roads were forced to meet to secure the business, while the Erie canal was not an effective competitor of the American roads, which also owned the Lake steam grain fleet, and the higher rate was sustained. The waterway is the only competitor the railroad has.

Division of Rail-Water Rates.

In the carriage of freight between Chicago and New York—by water to Buffalo, and rail thence to New York—the boats receive one-third and the cars two-thirds of the through rate, the boat mileage being double that of the car. In round numbers the railroad ton-mileage is about one-quarter that of the entire lake system, while the freight charge is more than double, showing a ratio of over 8 to 1 for general traffic in favor of water transportation.

It is not the intention here, nor should it be tolerated for a moment anywhere, to draw invidious distinctions between the barge and the freight car. They are both of equal importance to the wealth and advancement of the whole country. Each has its proper sphere in the world's trade. Highly finished products, perishable goods and those requiring rapid transit will invariably seek conveyance by rail, while coarse, bulky and durable merchandise may be content with the slower and cheaper carriage that is furnished by water routes. There is traffic enough for the railroads and the waterways and the more there are of these built and improved the greater will be the demand upon them for the conveyance of the products of farms and factories to the markets of the world.

Rate Barrier on Trade.

There is no section of the United States so densely populated and with so varied and extensive a commerce as the Middle West that is in so great and pressing need of cheaper transportation facilities. There is hardly

a wholesale merchant or manufacturer in the West who does not find himself barred, by practically prohibitory railroad freight rates, from and to the territory South of the Ohio River. The people of that section are as anxious to establish reciprocal trade relations with the West as the merchants of that section are to deal with them. Practically the same restrictions are placed upon the Southwest sections of the country. These barriers have been growing year by year in solidity and height until the efforts to remove them have been, practically, abandoned, and relief, if it comes at all, must be obtained through the construction or the improvement of waterways, a subject that is receiving the support of the people in all of the sections mentioned.

It is only fair to explain that these high railway rates are in great degree unavoidable. It costs money to construct and equip and operate a railway, and naturally the rates must be higher than over a water route, which is furnished free of charge. But, as previously explained, no matter how fair these railway rates may be when considered from the point of service rendered, there is a limit beyond which producers cannot afford to pay them on low-priced goods.

How the Producer Is Affected.

It may be possible, for instance, for an agriculturist or a manufacturer to ship his product, say 500 miles, and make a fair profit at a given rate. But the rate, while it may be only a living one for the railway, puts the limit of the territory in which the producer can do business at 500 miles. Beyond that he cannot go, at the

same proportionate rate, without losing his profit or entailing an actual loss.

The effect of this restraint of trade between the North and South is illustrated by the conditions at Cincinnati. That city, admirably situated to extend its trade across the Ohio River to the South, is held in check by its inability to exchange its own products for those of its Southern neighbors, owing to the lack of cheap transportation. The depressing effect of this restrictive condition shows itself in the fact that between 1890 and 1900 the increment of population in Cincinnati was less than 10 per cent, while the number of its manufacturing establishments and the value of their finished products very perceptibly declined. It is believed that nothing except natural waterways will restore the free and healthful commercial conditions that should exist between the Northwest and the Southern States. This is not because the railways are overcharging, but because the business will not stand the present transportation expense.

Effects of Cheap Transportation.

The direct and positive effects of cheap transportation upon the people and the prices they receive for their products and pay for such as they import, are clearly illustrated by the State of Ohio. In a History of the Ohio Canals, published by the Ohio State Archæological and Historical Society, the following declaration is made:

"At the time the canals were begun wheat was selling at from 20 to 30 cents a bushel in the interior of Ohio; corn 10 to 12 cents, and often lower. The farmer could

with difficulty raise money to pay his taxes while the produce of his farm was literally rotting in his yards for the want of a market. Before the canals were constructed it was no uncommon thing for a man to raise twenty bushels of wheat upon a new farm, spend a week with his team conveying it to market and receive in return for his labor two barrels of salt. The canals changed this. The price of wheat rose to 50 and 75 cents a bushel in the center of the State, and the prices of other products in proportion, while many articles of importation, including some of the most important necessaries of life, were greatly reduced in price. These benefits were not confined to the immediate vicinity of the canals, but extended their influence more than one hundred miles away. The canals opened new channels of intercommunication between different sections of the State, furnishing new avenues of foreign trade, enabling citizens of Ohio to place their produce in Eastern, Northern and Southern markets at an expense so greatly diminished that the value of the commodities at home increased from 25 to 100 per cent."

What the Waterway Means.

It is asserted that the completion of the Lakes-to-the-Gulf deep waterway and the improvement of the upper Mississippi will bring the Middle West into direct and close communication with the republic of Cuba and the entire group of West Indian islands, composing the Greater and Lesser Antilles, with more than 4,000,000 inhabitants, which are separated from our southern boundary by the Gulf of Mexico. In addition to these, and leaving out of consideration the broader extension

that has followed the completion of the Panama Canal, this improvement would immediately open to the Middle West the ports of six of the ten South American republics and those of five of the six states of Central America, the eleven having an aggregate population of more than 35,000,000 and an area twice that of the continental portion of the United States. If we add to this that large section of the Mexican republic that is supplied through the Gulf port of Vera Cruz, it is plain to be seen that the demands that would be made upon the Middle West for its products would be far in excess of its present ability to meet and supply.

Magnitude of South American Trade.

The people of the South American countries are purchasers of the products of the United States to the extent of $40,000,000 annually, while our purchases from them are considerably more than double that amount. Under present conditions of intercommunication between the two continents it is practically impossible to increase either our exports or imports or the volume of trade between North and South America. There trade restrictions bear more heavily upon the Middle West than upon any other portion of the country.

With direct water communication between the heart of the American continent and South and Central America, so that vessels loaded at Havana, La Guira, Vera Cruz, San Juan, Georgetown, Bahia, Rio Janeiro, Buenos Aires or Montevideo may, without breaking bulk, discharge their cargoes at ports on the shores of the upper Mississippi and the Great Lakes, it is hardly

possible to form any estimate of the impetus that would be given to the Central West nor of the strength and support it would be enabled to give to the government and the nation of which it now forms an important part. Manufacturing centers rivaling those in New England would spring up in every State of the Middle West.

Will Aid Panama Canal.

By August 14, 1914, the Panama Canal had been excavated wide and deep enough to permit all but vessels of a very large size to pass through, and on that date the canal was opened for general traffic. Now that work is finished, its success as a financial undertaking will depend in the main upon the resources of the Middle West. The relations between the two must be, in the very nature of things, reciprocal. The canal will confer as great benefits upon the West as that section will upon the interoceanic highway. The extent of all these advantages will depend solely upon the facilities for bringing the products of the upper Mississippi Valley to the Gulf of Mexico.

These products are such as naturally seek water transportation; they are too bulky and too sensitive to rates of transportation to be profitably carried by rail. In the western tier of States forming the Central West, Minnesota, the two Dakotas, Iowa, Nebraska and Kansas, the exportable products are almost wholly grain and provisions, but while the other States of the section ship large quantities of those commodities they also export large consignments of machinery; wooden ware; sash, doors and blinds; wagons; boots and shoes; canned

products, and various kinds of other manufactured goods for which a demand has been created both in the foreign and domestic markets. To reach Mexico these goods are frequently sent by way of San Francisco and sometimes via New York.

Present Round-About Route.

Shipments to Central America, or the western coast of South America, go to New York and thence to Panama. For Hawaii the shipments are via San Francisco or New York and then around Cape Horn. The carriage of these heavy products by rail half way across the continent to tide water imposes a tax upon the industrial energy and commercial advancement of the Middle West that is a serious check on the growth of the entire section. In many cases it is a prohibitory bar to commercial relations between the Central West and all foreign markets.

With water transportation to the Gulf of Mexico, the Middle West would be able to compete successfully with manufacturers on, or near, the coasts, a rivalry in which the West would have little to fear. Nothing better illustrates the situation at the West or voices a sentiment that is more universal than the declaration made in the Government Report on the Isthmian Canal that "whatever affects the transportation facilities of the Central West touches its economic life at the very center."

"The canals not only saved money to the people of the State by raising the price of their products and lowering the cost of what they imported; they stimulated production and, consequently, increased exportation."—*Report of State of Ohio on History of State Canals.*

"Confidence is such an important element in the business of the country that it cannot be seriously disturbed without such disturbance being reflected in every branch of commercial and manufacturing activity."—*W. C. Brown, President New York Central Lines.*

FOREIGN TRADE

"The possibilities of controlling rates and character of service in such a way as to realize the fullest benefits for the public are conditioned largely upon the form of franchise. We have to deal with three general forms in the United States—the unlimited, the indeterminate and the term."—*Dr. Frederic W. Speirs, Philadelphia.*

"It is no part of the purpose of this legislation to oppress or add burdens to the business enterprises of the country, but rather to promote the welfare of both employer and employe by adjusting the losses and injuries inseparable from industry and commerce, to the strength of those who in the nature of the case ought to share the burden."—*The Hon. J. P. Dolliver, United States Senator from Iowa.*

CHAPTER XX.

VESSELS IN FOREIGN TRADE.

In the fiscal year ending June 30, 1915, the foreign merchandise trade of the United States amounted to $4,442,759,080. In addition to this, we handled $397,845,413 in gold and silver, making a total trade of $4,840,604,493. On the merchandise account there was a balance in our favor of $1,094,419,600. In other words, we sold considerably more than a billion dollars' worth of goods more than we bought.

The conditions under which this immense business is transacted form one of the most interesting and important chapters in the history of transportation. The system, under Federal supervision, is so well organized and regulated that everything moves like clockwork, and, despite the enormous volume of business, there is virtually no serious delay or annoyance.

Outline of the System.

The great bulk of merchandise coming into this country—the imports—is subject to an import or customs duty, and to assist in the collection of this the Federal government maintains 103 customs stations. Of these, thirty-two are located on the Atlantic coast, eleven on the Pacific, nine on the Gulf, five on the Mexican border, twenty-four on the Northern frontier (principally on the great lakes), and twenty-two at interior towns.

All the stations on the Atlantic, Pacific and Gulf and most of those on the great lakes are ports of entry and clearance for vessels in the foreign trade. Those on the Mexican border are maintained so as to regulate the overland commerce, while the stations in the interior cities are merely for the accommodation of those who find it more convenient to pay the duties at these points than at the ports of entry.

Ships Must Have Their Papers.

All vessels engaged in traffic on the high seas must have their papers. Lack of these papers, showing the legitimacy of the vessel and its traffic, renders the craft liable to detention and fine by the authorities of any port in which it may seek refuge, and even to seizure and confiscation in time of war.

All civilized nations engaged in maritime commerce keep an official record of the vessels flying the flags of the respective countries. Thus, England keeps a record of all vessels flying the British flag, the United States of those which fly the American flag, etc.; and the marine law is such, the world over, that a vessel must use the flag of the country in which it is registered.

When Certificate Becomes Void.

In case of the loss of a vessel by wreck, storm or other disaster, the certificate of registry becomes void, and, if preserved, must be delivered to the customs authorities. In case the whole or any part of the vessel is sold to a foreigner, the certificate lapses and must be surrendered to the collector of the port in the United States where the master of such vessel may land.

When a registered vessel is sold, either in whole or in part, it must be registered anew even though the purchaser be a citizen of the United States. New registry will not be made unless a proper bill of sale is exhibited to the collector. Failure to surrender the original certificate is punishable by a fine of $500.

Vessels Entitled to Registry.

Every country naturally formulates its marine laws with the purpose of encouraging and enlarging its shipping. In the United States, for instance, certain allowances are made on the tonnage tax for vessels of American registry. The vessels which are entitled to this registry are:

Those built in the United States and wholly owned here. A vessel, although built in the United States, in which a foreigner holds any monetary interest, is not entitled to American registry, and can not legally fly the American flag.

Vessels captured by a citizen of the United States in a war to which the United States is a party, which have been lawfully condemned as prizes and bought by a citizen of this country. Under this clause a foreign-built vessel may obtain American registry, provided the conditions are complied with.

Protection Given to Registry.

Registry is a valuable right, especially in time of war. Let us assume that France and England are at war. The fighting vessels of one country will naturally try to capture the merchantmen of the other, confiscating both vessels and cargoes. But craft flying the

American flag, or that of any other non-belligerent country, will not be molested so long as they can show legitimate registry under the flag they are flying.

The mere flying of a certain flag carries no significance or protection, unless the master of the craft can substantiate his declaration by flag with the proper documents. It would be easy for any master to hoist an American flag in time of trouble, but it would do him little good if he were unable to produce papers which would pass inspection.

Plain Marks of Identification.

There are certain links of identification between a ship's papers and the ship itself. The United States laws provide that the vessel's net tonnage as stated in the certificate of registry must be indelibly carved or marked on the main beam; the draught must be recorded on the stem and sternpost; the official number of the vessel must be permanently carved, branded or painted on the main beam; the full name of the craft must be carved, gilded or painted on each side of the bow in letters at least four inches in length; the name and port of registry must be similarly placed on the stern, and all steam vessels must, in addition, bear their name in six-inch letters on each side of the wheelhouse.

All of these marks must be duplicated in the registry so that comparison of the vessel with the papers will afford ample means of identification.

Changing of Vessel Names.

Change of name is discouraged by the authorities and made as difficult as possible. When a change is desired, application must be made to the Commissioner

of Navigation, must show the reason for the desired change, and establish the fact that the vessel is not over twenty years old. If the craft is between ten and fifteen years old, repairs to the amount of not less than forty per cent. of the original cost must have been made; if between fifteen and twenty years old, the repairs must amount to sixty per cent. of first cost. The name which it is desired to discard must have been in use for at least five years prior to the application. The name of a mortgaged vessel can not be changed under any condition, not even with consent of the mortgagee.

Strict Conditions of Registry.

In addition to the application and affidavit of the owner, a certificate is also required from the master carpenter who built the vessel, before registry can be obtained. This certificate must state time and place of building, person for whom built, number of decks and masts, length, depth, breadth and tonnage, and such other particulars as will tend to make identification easy. The time of building is the year of completion. The place of building is where the hull was built.

If any of the matters of fact stated in the affidavit for registration be false, the law provides that there shall be a forfeiture of the vessel, tackle and furniture; or the value thereof may be recovered by a suit at law.

Application for registry is made in the following form:

I, ———— ————, of ————, in the county of ————, and State of ————, do swear, according to the best of my knowledge and belief, that the vessel called the ————,

of ————, is of burden ——— tons, and was built at ————, in the State of ————, in the year ———; that I am a citizen of the United States; that my present usual place of residence or abode is ————, in the county of ————, and State of ————; that I am the true and sole owner of said vessel; that no subject or citizen of any foreign power is, directly or indirectly, by way of trust, confidence, or otherwise, interested therein, or in the profits or issues thereof, and that ———— ————, the present master thereof, is a citizen of the United States, having been born within the limits thereof.

———— ————.

Sworn to and subscribed before me, this ——— day of ————, 19 —.

———— ————, Collector.

Masters Must Be Citizens.

If the master of the vessel is not a native, the application, in lieu of the statement that he was born within the limits of this country, must contain the following:

Naturalized in the State of ———— on the ——— day of ————, 191—, by virtue of a decree or order of the ———— court of ————, and the oath of allegiance according to law.

No person, not a citizen of the United States by birth or naturalization, will be allowed to navigate or hold any official position on a vessel of American registry. In addition to the master or captain, the various mates, the chief and assistant engineers, everybody who is in charge of a "watch," and responsible for the navigation of the vessel during that "watch," must be a citizen of the United States.

An American vessel arriving at an American port with a foreigner occupying an official position of authority on such vessel (except in case of emergency), is subject to a duty of 50 cents per ton of capacity. This on a craft of 2,500 tons' burthen would amount to $1,250. In any event the services of such alien officer must be dispensed with when the vessel reaches its home port.

The "Husband" of a Vessel.

In nautical parlance, the managing owner of a vessel is the "husband" of the vessel, and from this old-time usage has doubtless sprung the custom of using the feminine gender in referring to vessels. Among sailormen a vessel is invariably spoken of as "she"; never as "he," or "it." This term is officially recognized by the United States treasury officials in the certificate of proof of ownership, which reads as follows:

I, ———— ————, husband or managing owner, do swear (or affirm) that the ship (or vessel) ————, burden ————, whereof ———— ———— is at present master, is wholly the property of a citizen or citizens of the United States (or if such be the fact, of a company duly incorporated under the laws of the State of ————, and entitled ————).

———— ————.

Subscribed to, etc.

Deciding Upon Tonnage Capacity.

The word "tonnage" is used in marine circles to denote the weight or displacement of water by a vessel, and also to indicate cargo capacity. The first definition applies almost exclusively to naval craft and pleasure yachts; the latter to vessels in the carrying trade. The legal tonnage of a merchant vessel is determined by the internal cubical measurement, less certain reserved spaces, this cubical measurement being expressed in tons of 100 cubic feet each. Thus, a vessel with a cubical measurement of 100,000 feet would have a capacity of 1,000 tons, and would be classed as being of "1,000 tons burthen."

How Measurements are Made.

In getting the internal cubical capacity, the experts first measure the length of the vessel on the upper side

of the tonnage deck in a straight line from stem to stern plank. This length is then divided, according to the size of the vessel, into equal "parts," varying from six for vessels of fifty feet in length to sixteen for those of 250 feet or over. A craft 150 feet long would be divided into ten parts of fifteen feet each.

The measurers next take the width measure at as many different points as the length is divided into, so as to get the accurate transverse area, allowing for the "swell" or "bulge" of the sides from bow to stern. One measurement of width would not do, because all vessels are so constructed that there is no two or more points, a few feet apart, where the width measurement is exactly the same. For a ship 150 feet in length, ten of these width measurements would be taken.

Getting at Total Tonnage.

The next move is to get at the depth of the hold, and here again, owing to the peculiar shape of the hull—deepening as it approaches the keel—resort is had to a method of subdivision into parts similar to that employed in taking the width.

The parts into which the length is divided are numbered from No. 1, beginning at the bow, and ending with No. 10, on a 150-foot ship, at the stern. Having the length, width and depth of each one of these parts, the cubical area is figured for each separately, and then added together, giving the total tonnage capacity.

Part No. 1, owing to the narrowness of the bow, will be of greatly restricted tonnage area. The capacity of each part will increase greatly until the center or "midship" section is reached, and then begin to fall off

again toward the stern, but not to such marked degree as in the bow.

Figuring the Cargo Tonnage.

In taking cargo tonnage measurements, the space occupied by engines, boilers, coal bunkers, pilot-house, cabins, etc., are omitted. The purpose is to get actual cargo capacity.

This does not mean that the spaces thus occupied are not measured. Their dimensions are taken and the tonnage capacity computed. This is then subtracted from the total, and the net cargo tonnage thus ascertained. In the following statement we have an illustration, taken from official records, of how the measurements are computed:

	Tons.	Tons.
Under tonnage deck	2,669.05	
Chart house	4.48	
Forecastle	38.06	
Round houses	64.99	
Excess hatchways	45.23	
Light and air	54.05	
Gross		2,875.86
Deductions—		
Engines, boilers, coal	920.28	
Crew	59.82	
Master	5.09	
Chart room	4.48	
Boatswain's stores	28.75	
		1,018.42
Net cargo tonnage		1,857.44

Reason for Exact Measurements.

Why go to all this trouble? Why not make an estimate as to vessel tonnage, both gross and net? Because the figures must be exact, for numerous reasons.

One is that exactitude in size is an important factor in identification. Another, and still more important, reason is that, aside from customs duties on the cargo, a tax is collected from vessels on the basis of tonnage capacity, and this capacity must be definitely stated, so no injustice will be done.

CHAPTER XXI.

WORK OF THE CUSTOM HOUSE.

A very large part of the revenues of the Federal government are collected in the form of customs duties on imported merchandise. In a recent year the duty actually collected on merchandise entered for consumption was $282,582,895. This did not include merchandise to the value of $67,921,293 remaining in warehouse, pending its dispersal in the avenues of trade.

For the collection of these customs duties, the Federal authorities maintain one of the most thoroughly organized and intelligently directed systems in the world. Such serious dissatisfaction as may exist is directed against alleged defects in the tariff act under which the customs duties are collected, rather than with the method of collection itself.

How Vessels Make Clearance.

At every point along the seacoast where there is a harbor large enough to accommodate sea-going vessels, the Federal government maintains a port of entry and clearance. No sea-going vessel can legitimately enter or leave one of these ports except with the knowledge and by the consent of the local representatives of the Treasury Department.

The *Ocean Queen*, let us say, is about to leave New York for Hong Kong, China, with a cargo of railway

iron. The master must first obtain from the collector of the port a clearance paper. This shows, over the signature of the master, and verified by the collector, the name of the vessel, name of master, date of sailing, nature of cargo, and ports of sailing and destination. The master must also obtain from the collector a clean bill of health as to the sanitary condition of the vessel and crew, and a copy of the articles under which the crew is shipped for the voyage.

Should the *Ocean Queen* be diverted en route from the legitimate purposes of its voyage; should, for instance, its cargo of railway iron turn out to be munitions of war for some insurgent force, the master and owners of the vessel would get into serious trouble with the authorities.

In case a vessel clearing for Hong Kong is found headed for Lima, Peru, without reasonable excuse, it is the custom to treat the master as a pirate who intends to steal the ship and cargo, or engage in some other illegal act.

Use of Clearance Papers.

When a vessel, either in the coastwise or foreign trade, enters an American port, it is visited at once by an official known as a boarding officer. The master delivers to this officer one of the papers obtained at the port of sailing. This is known as the ship's manifest, and is in form as follows:

Report and manifest of the cargo laden on board of the ———— of ————, whereof ———— ———— is master, and which is of the capacity of ———— tons, built at ————, and owned by ————, of ————; as per register granted at ————, the ——— day of ————, 191 , and bound for ————; which cargo was taken on board at ————:

Marks.	No. Inclusive.	Packages and Contents.	By Whom Shipped.	To Whom Consigned.	Consignee's Residence.	Port of Destination.

Returned cargo ————.
Names of passengers, and description and number of packages belonging to them respectively: ————.
Vessel and cabin stores: ————.

————, Master.

Endorsement of the Manifest.

On delivery of the original manifest, the boarding officer, if satisfied that everything is correct, returns it to the master, first endorsing it as follows:

I, ———— ————, certify that the within manifest was this day produced to me as an original manifest of the cargo on board the ————, whereof ———— is master, from ————.
In witness whereof I have hereunto signed my name, this ——— day of ————, 19——.

————— ————.

In the meantime the master has supplied the boarding officer with copies of the manifest for filing with the collector of the port. These copies are also endorsed by the boarding officer, who certifies that he has compared them with the original and finds them to agree. All this is preliminary to the arrival at wharf or anchorage at the port of entry.

Arrival at the Wharf.

On arrival at the wharf, the master must, within twenty-four hours, on pain of a $1,000 fine, file with the collector of the port the original manifest. This must

be accompanied by a certificate from the health officer of the port, showing that vessel, cargo, passengers and crew are free from contagious or infectious disease.

Permission is then given the master to unload, and the cargo is put out on the wharf. As it is unladen, customs inspectors check over the various items and compare them with the ship's manifest. Articles on which there is no duty may be removed at once; those that are dutiable are examined closely by the inspectors to see that they agree in quality and quantity with the manifest.

Limit to Unloading Time.

Vessels are limited by custom-house regulation as to the time allowed for unloading. The limit is:

Vessels of less than 500 tons, 10 working days after entry.

Between 500 and 1,000 tons, 15 days.

Between 1,000 and 1,500 tons, 20 days.

Vessels of 1,500 tons and over, 25 days.

If any merchandise remains on board a vessel at the expiration of this limit, it is the duty of the collector to take possession of it. In computing working days, legal holidays and stormy weather are excluded.

All declarations of goods liable to duty should be accompanied with the original invoices showing nature of goods, quantity, quality and price.

How Goods Are Imported.

Large orders for foreign goods are sent to European houses either direct by correspondence or through New York commission merchants who make a specialty of

import trade. The largest American importers have men whom they call their *foreign buyers.* These go abroad at certain seasons and make purchases direct from European houses. They simply buy the goods—that is, order them—and leave the shipping and all the routine connected therewith to the seller.

When the goods are ready for shipment, the foreign house makes out an invoice—three copies. These are taken to the office of the nearest United States consul and an oath is taken to the effect that the particulars and prices are absolutely as stated. This precaution is to prevent fraud. A foreign merchant might be in collusion with an American importer and invoice goods at a value lower than their actual price to reduce the amount of duty to be paid at the American port of entry. The consul files one copy of the invoice; the second he sends to the custom house where the goods are to be entered; and the third is returned to the shipper. The cases are forwarded to the seaport town, where a bill of lading, also in triplicate, is issued by the ship or her agents. The invoice, the bill of lading, and the consul's certificate are mailed to the consignee at the port of destination.

The Custom-House Routine.

Upon arrival of the goods, the consignee usually takes the papers to his custom-house broker, who for a moderate fee does the necessary routine work of *passing the goods* at the custom house. The consignee may save this expense by attending to the matter himself, but usually he finds it a saving of expense as well as of time to allow a broker to do the work for him. If he wishes

to pay the duty immediately, he makes what is known as a *cash entry*. If he does not require the goods immediately, he may make a *warehouse entry*. When the latter is done, the duty need not be paid until the goods are taken from the bonded warehouse. The cases may be taken in lots at different times at the convenience of the importer. In the entry of goods for a bonded warehouse the government requires a bond from the importer, with a surety that he will pay the duty within three years, or export the goods to some other country.

Consumption Entry.

Entry of merchandise imported by ———— ————, in the ————, ———— ————, master, from ————, on the ——— day of ————, ———:

Marks.	Numbers.	Packages and contents. (For specifications see accompanying invoice.)	Quantity.	Invoice Value.	Dutiable Value.	Rate.	Duty.

Entered at port of ————, ——— day of ————, ———.

(Importer's signature.)

When goods are consigned to the interior of the United States—that is, to cities or towns which are not ports of entry, they can be sent from the port of shipment to the port of entry, and then forwarded *in bond* to the point of destination. The invoice, bill of lading, and other papers are sent to the custom-house broker at a port of arrival where the custom-house entries are made and the goods trans-shipped. The bill of lading

should read, "In bond to ——," wherever the destination may be.

Examination of Imported Goods.

When the goods are discharged from the vessel, they are sent to what is known as the United States appraiser's stores for examination. Here the examiners

Entry for Warehouse.

Custom-House, ————,
Port of ————, ——.

Entry for warehouse of merchandise imported by ———— ————, in the ————, ———— ————, master, from ————, on the —— day of ————, ——.

Marks.	Numbers.	Packages and contents. (For specifications see accompanying invoice.)	Quantity.	Invoice Value.	Dutiable Value.	Rate.	Duty.	Total.	Dutiable Value of Each Package.

(Signature of importer.)

have the cases opened and compare the goods to see if they correspond with the invoices, and that the prices are correct. Should the appraiser deem the goods rated wrong, he returns the invoice to the collector's office, where the matter is adjusted, and notice of the additional duty necessary is sent to the importer. Should the importer consider that he has been unfairly treated

he has redress by formal protest to the board of government appraisers. If this board decides against him he can sue the collector and bring the matter before the United States Court.

Entry Blank.

Bond No. ——.

District of ————,

Port of ————, ————, ————.

Entry of merchandise to be rewarehoused and withdrawn for immediate consumption by ———— ————, which was brought into this district on the ——— day of ————, ——, by ———— ————, from the port of ————, on the (route or vessel), having been originally imported into ——— by ———— ————, in the ————, from ————, on the ——— day of ————, ———.

Marks.	Numbers.	Packages and Contents.	Quantity.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Total.	Dutiable Value of Each Package.

Consigned to ———— ————.

———— ———— ————.

Penalties for Fraud, Etc.

Should the appraiser consider that the goods have been invoiced at too low a figure, he can advance the same to what he considers right. If this advance is over ten per cent., a penalty fine (as may be prescribed by law) is charged, and if the advance is over forty per cent., the case is presumed to be one of fraud, and the goods may be confiscated.

Every entry has to be sworn to by a member of the importing firm, before the collector or one of his deputies. If it is not convenient for a member of the importing firm to do this, then his agent, who holds power of attorney, makes oath, and gives a bond for the production of the importer's declaration at some subsequent time. When a consignee receives his bill of lading, but no invoice, he can, where the value is less than $100, make what is known as an *appraisement entry,* but where the value exceeds $100, and he knows the contents and prices, he can make out a *pro-forma invoice,* giving a bond to the government for the production later of a properly certified invoice.

Imports for Exportation.

Goods can be brought into the United States and immediately exported to Canada, without payment of duty, providing the bill of lading states "For immediate exportation," or the imported goods may be placed in a bonded warehouse and exported any time within three years. The owner of goods on which *import duties* have been paid is entitled to have such duties wholly or partly paid back if he decides to export the goods to a foreign point. For instance, a merchant might import $1,000 worth of goods from England, store them in a New York bonded warehouse, and at his convenience export them to Cuba or Brazil or some other country. It is evident that it would be unfair to pay the United States duty when the goods were not for use here. The amount refunded in such a case is called *drawback,* and is fixed by schedule approved by the Secretary of the Treasury. The claim for *draw-*

back must be made before the goods are shipped and in such form as the secretary may prescribe. The advantage of this system is easily seen in the fact that it enables our merchants to compete with foreign traders in business outside of our own country.

CHAPTER XXII.

THE BONDED WAREHOUSE.

Dutiable merchandise imported from foreign countries may be stored in government or private bonded warehouses, and the payment of duty thus deferred for three years. Certificates or receipts issued against merchandise thus stored are negotiable, and an importer may raise money on these receipts while still holding his goods in store and awaiting a favorable market.

This bonded warehouse system makes it possible for an American merchant to take advantage of depressions in foreign markets by buying goods when they are low, and storing them in this country ready to take advantage of any improvement in the home market.

Scope of Bonded Warehouse.

Bonded warehouses, both those owned by the government and by private companies, are under the control of custom house officials known as government storekeepers. The storekeeper carries the keys and no goods can be removed without his consent, which is given only upon order from the custom house, and not then unless the storage charges have been paid. Only goods which are dutiable go into bonded warehouses. The *warehouse receipt* given by private warehouse companies is a negotiable instrument and may be used with banks as collateral security for money borrowed, or the

goods stored may be sold and the storage receipt *passed* from the seller to the buyer just as would be done with a deed or other instrument of value.

Honesty Secured by Bonds.

Everybody connected with a bonded warehouse is under bond—the man who owns and conducts the business, and the man whose team and dray takes the goods from the vessel to the storage place. These bonds run to the government and are given as a guarantee that the business will be honestly conducted and the duties will be paid on the imported goods entrusted to the care of the warehouseman.

When the goods are being unloaded the ship-master gives a ticket with particulars of the goods to the driver of the bonded dray. Upon delivery of the goods to the warehouse this ticket is turned over to the storekeeper, who delivers it to the custom house. The importer receives a delivery order for each lot of goods stored. These orders may be exchanged for a warehouse receipt just as railroad receipts may be exchanged for a bill-of-lading. The holder of the warehouse receipt has a title to the merchandise it represents.

Making Entry for Warehouse.

When an importer has goods arriving which he desires to send to bonded warehouse entry for such purpose is made in the form described in Chapter XXI.

When the entry is filed the custom officials pass the designated goods to the custody of the warehouseman, who from then on is responsible to the government for their safe keeping until released on the order of the collector. In return the importer receives from the

warehouseman a certificate acknowledging receipt of the goods and containing the same description as given on the entry form.

Stamping Value on Invoice.

All package goods sent to bonded warehouse must be numbered or marked on the entry form and in all subsequent transactions must be referred to by such numbers.

At the appraiser's stores such packages will be examined and, if found to agree with the entry blank and invoice as to quantity, quality, etc., will be passed on to the warehouse for storage.

Accompanying each consignment to a warehouse must be an invoice showing the actual purchase price of the goods. This invoice is a duplicate of the bill issued by the seller to the buyer and must be certified to by the American consul at place of purchase or shipment. On this invoice the collector stamps the following form:

D. L. Ruth, Collector's Office.	C. G. Clark, Naval Office.
Entered value ..... 10,600.00 francs 50% Less nondutiable charges..... 450.00 francs Add for value..... 1,200.00 francs	
Name of vessel or transportation line: MAJESTIC.	
Warehouse: PRENTICE STORES.	
I certify that this invoice was presented to me on entry, custom-house, New York, this day of , 19 .	

_____, _____,
Deputy Collector.

Punishment for Wrong Valuation.

If there is any suspicion on the part of the officials that the goods have been overvalued, or wrongly classified, a rigid re-examination will be made by the inspector. If this second examination reveals ample proof of wrongdoing on the part of the importer it will result in confiscation of the goods, and perhaps criminal prosecution of the offender. If the offense is slight, or apparently unintentional, a light fine may be inflicted.

While the goods are in storage the importer or his representative may examine them, or take reasonable samples at any time during regular business hours, and may make any repairs, or do any repacking which may be necessary, provided that the original marks and numbers of the packages are retained.

Dutiable Goods for Export.

When dutiable goods are placed in a bonded warehouse and later withdrawn for exportation to some foreign country the duty is cancelled, and the goods may be withdrawn on payment of the storage charges only. In an instance of this kind the exporter makes the following declaration:

Declaration on Export Withdrawal.

I, ———— ————, do solemnly, sincerely, and truly declare that the goods, wares, and merchandise described in the within withdrawal, now delivered by me to the collector of the customs for the port of ————, are truly intended to be exported by me to the port of ————, as stated in said entry, and by the vessel therein indicated, and are not intended to be relanded or consumed within the limits of the United States;

and that, to the best of my knowledge and belief, the said goods, wares, and merchandise are the same in quality, quantity, value, and package (wastage and damage excepted) as at the time of importation.

————— ————, Exporter.

Port of ————.

Declared this ——— day of ————, ———, before me.

————— ————, Collector.

The exporter signs a bond in double the value of the goods and the collector then issues a permit for the withdrawal of the goods.

Keeping Track of Exported Goods.

But how shall the customs authorities know that the dutiable goods are actually exported and not consumed in this country?

Before the bond can be cancelled the consignee at the foreign port must furnish to the collector at the port of clearance documentary evidence of the receipt of the goods. This is to be in the form of a certificate authenticated by an American consul, or some other authorized person and must be furnished within one year, except from Asian and African ports where two years is allowed. If this certificate is not forthcoming at the proper time recourse may be had on the bond.

Should failure to deliver be the fault of the master of the vessel both he and the vessel will be subject to discipline in the way of heavy fines.

Rate of Warehouse Charges.

Some importers own bonded warehouses in which they store none but their own goods. The majority of warehouses, however, are owned by people who do a general storage business.

Importers who place goods in bonded warehouses must, of course, pay storage charges. That is the way

the proprietors of these warehouses make their money. The storage rates vary greatly. The space occupied and the labor of handling are the most important considerations. Flour, for instance, would cost about 3 cents a barrel for the first 30 days and 2 cents a barrel for each succeeding 15 days. If a rate were quoted as 10 and 8 it would indicate 10 cents for storage and 8 cents for labor for the first period of time, and 10 cents for each successive period.

Bond Upon Entry.

Know all men by these presents, that we, ———— ————, as principals, and ———— ————, as sureties, are held and firmly bound unto the United States of America in the sum of ten thousand dollars for the payment whereof to the United States we firmly bind ourselves, our heirs, executors, administrators, and assigns, jointly and severally, by these presents, as witness our hands and seals, at the port of ————, this ———— day of ————, nineteen hundred and ————.

Whereas the undersigned, principals on this bond, propose to enter at the custom-house, and to transport merchandise imported under the provisions of the act entitled "An act to expedite the delivery of imported parcels and packages not exceeding five hundred dollars in value," approved June 8, 1896:

Now, therefore, the conditions of this obligation are such that if the herein-mentioned obligors shall duly observe and faithfully comply with all the requirements and provisions of the above-specified act, and with the regulations prescribed by the Secretary of the Treasury thereunder, then this obligation to be void; otherwise to remain in full force.

———— ————. (SEAL.)
———— ————. (SEAL.)
———— ————. (SEAL.)

Signed, sealed and delivered in presence of—

———— ————.
———— ————.

CHAPTER XXIII.

ELECTRIC RAILWAYS IN THE U. S.

The development of electric railways in the United States, which leads the world in this form of transportation, has taken place within less than thirty years. At the date of the last official report there were 1,260 electric street railway systems in the country, employing a total of 282,461 men and representing an investment of $4,708,567,141. So complete is the network of electric railways that today one can travel from Boston to Chicago with only a few miles of steam travel where there are gaps yet to be filled.

The number of miles of line operated by the electric railways was 30,437 miles, having 41,064 miles of single track. The total number of cars was 94,016, including 76,162 passenger cars, the rest being used for the transportation of freight and express matter, and for construction and repairs, etc. There were also 277 electric locomotives in use, while the total horse-power of all the electric motors employed in transportation was 3,665,051.

Passengers carried on the electric roads during the last year for which reports are available numbered 12,135,341,716, and the gross income of the operating companies amounted to $585,930,517. The companies paid dividends amounting to $51,650,117 and reported a surplus of $10,260,636.

This enormous business has been developed since the year 1888, when the first electric motors propelling street cars in Richmond, Virginia, startled the people by the terrifying flashes at the overhead "collector" and from the motor brushes. The improvements made in the various elements were so rapid that soon the electric motors not only displaced horses as motive power, but also led to the extension of the field of city transportation. Then there followed the development of many thousands of miles of interurban electric lines, which have brought the outlying farms close to the cities in almost every locality east of the Mississippi River. This network is being steadily extended and will eventually cover the entire country as the density of population increases. The effect of the inter-communication so afforded is incalculable, from both an economic and a sociological standpoint.

It is interesting to know, in these days when so much is heard about the increased cost of living, that such elements in our daily lives as are served by electricity have steadily decreased in cost and today we ride farther for a nickel and have more electric light illumination for less money than ever before.

Equipment of Electric Railways.

Many varied conditions confront electrical engineers when the question of equipping an electric railway arises for consideration. In general there are at least six different classes of service for equipment at the present time, viz., city, interurban, elevated, subway, steam railway terminal electrification and main line railway electrification.

The electrical equipment of city car service may be divided into two classes, viz., two and four-motor equipments; of trucks, in general, there are three types, viz., single trucks, maximum-traction trucks, and double trucks. The number of combinations that can be made when applying power to the car with these elements is surprising. The proportion of the total car weight on the driving wheels largely determines the schedule possibilities and the grade-climbing capacity of a car.

With the single-truck, two-motor equipment, all the weight is on the driving wheels; so that this combination would be ideal were it not for the fact that the demands of seating capacity and riding quality put limitations on the single-truck car that usually make it necessary to have double-truck equipments.

With the double-truck car there are many complications which arise when selecting a distribution of power for the driving axles. A selection which will give uniform weights on the wheel treads will, of course, give the ideal car, for it will reduce wheel slippage to a minimum under all conditions. With a four-motor equipment and motors "inside hung" it is possible to secure the nearest approach to equalization of the weights on the wheel treads.

In addition to the many combinations of motor mounting for a single car, there is trailer operation to consider and also the effect of these trailers on wheel slippage, both on level track and also on grades. An analysis of the weight distribution on single-motor cars indicates clearly the reason for usually selecting four-motor equipments when trailer operation is to be considered. This analysis of weight distribution shows

why, when the grades to be negotiated are more than five per cent it is the general practice to use four-motor equipments for double-truck cars.

There are at least twelve to fifteen different combinations of mounting motors on the different types of trucks in general use.

After the question of deciding how many motors are to be used on a car, the next factors to consider are how to get the greatest amount of work out of the motors per pound of weight, how to secure the motor that will use the least power, and at the same time to obtain an equipment at a price that will be justified by the results of these savings.

Changes in Car Wheels and Control.

Car wheels in city service have been for the most part of 33-inch diameter, but during the last few years there has been an increasing amount of interest exhibited regarding 24-inch wheel equipments for city service. Motors that are particularly efficient and well constructed have been designed for use with these equipments. Due to the decreased weight of the wheels and trucks as well as to the reduction in the weight of the motors, this subject has engaged active study.

In addition to the weight savings there has also been an innovation in control which consists of a change in the standard motor circuit connections so that three running speeds are obtained. With this combination of control there is a considerable saving in power consumption. In some cases a saving of seven or eight per cent may be expected. It is necessary, however, in connection with this control to carefully analyze the service,

for experience has shown that the heating is not equally divided among the four motors of the equipment.

Interurban Railway Equipment.

In the selection of interurban equipments the same considerations in regard to motor distribution apply as have been mentioned for city cars. Practically all equipments in this class of service employ four motors, and it is the usual practice for the motors to be inside-hung. There has not been a general adoption of field control for interurban work due to the fact that as a rule the stops, as compared with city service, are relatively infrequent and therefore the savings which can be made with city equipments are not so apparent in the interurban equipments.

Interurban Roads and Carload Freight.

Recently it has been found that a large number of interurban roads have practically reached the limit of their earning power, as they are securing all of the business which there is at the present time, and the only additional business which can come to them is through the natural increase of business due to the growth of the community. This has led the management of these properties to carefully consider and to estimate the cost of entering into the business of hauling car-load freight. As a result it would not be surprising if a large number of roads purchase electric locomotives in the near future in order to increase their earnings per mile of track. To select the motors for this service, it has usually been the practice to start with locomotives weighing approximately 40 tons. Sometimes these units are of the regu-

lar locomotive type and sometimes of the baggage-car type. These units as a rule are equipped with four 125-H.P. motors. On some roads this business has grown to such an extent that it is necessary to use 60-ton locomotives, which are usually equipped with four 225-H.P. motors.

Electrification of Steam Roads.

The question is often asked, When will our railroads be operated by electricity? In a recent lecture by Dr. Steinmetz, the electrical expert, the statement was made that there is more aggregate horse-power in electric motors operating cars and locomotives today than the aggregate horse-power capacity of all the steam passenger locomotives used for transportation in this country. The day has not yet arrived when the universal electrification of our steam railroads can be economically accomplished, but the decreasing cost of power and the lower cost of electric equipment for rolling stock are gradually extending the field where the application of electricity to transportation is justified and will eventually permit electricity to replace steam on all important railroad divisions.

At present, said Mr. C. E. Eveleth, an expert engineer of the General Electric Company, in a lecture delivered in New York City, we are using electricity to accomplish results unattainable with steam engines, notwithstanding the magnificent results which the steam-engine designer has achieved with the Mallet locomotive, oil-fired boilers, and the use of superheated steam. Of all known agents electricity is the most convenient means of distributing power, and its application to

transportation successfully overcomes widely differing conditions of limitation. On some railroad divisions about one-twentieth of the gross ton-mileage is used for hauling the coal to supply the steam locomotives with fuel; on other sections, the speed on going up-grade is limited by the boiler capacity of the engines. The operation in descending these same grades is frequently hazardous, owing to the possibility of the loss of air for the air-brakes, or danger from overheated brake-shoes and wheel tires.

Applying electric locomotives to these conditions, in many instances, eliminates entirely the freight tonnage required to haul fuel. The speed of freight trains up grade can be increased to the maximum safe or economic limit, and by the use of regeneration the electrical engineer can not only lessen the danger from failure of air for the brakes and the heating of tires and brake-shoes, but is also able actually to recover a material portion of the energy given up by a train descending a mountain and to utilize this power for ascending trains. Electric engineering can not only overcome the railroading difficulties incident to bad water in desert regions, but can also transport the suburbanite more quickly to his home.

Other limiting conditions which can only be met by electric traction are the elimination of smoke, the better utilization of space in city terminals by the use of different track levels, the elimination of roundhouses, and turn-tables, and the saving of time required by steam locomotives while going for water and cleaning fires.

Science of Electric Railroading.

Electric railroading may be considered under two broad divisions, says Mr. Eveleth in an article based on the lecture referred to above. One may be called the "science" and the other the "art" of electric railroading. The "science" has to do with all the fundamental details which enter into the present development and includes the work of improvements and invention, which are necessary to broaden the field of electric traction. This includes developments in insulation, designs of generating, transmission, conversion and rolling stock equipment parts, the solution of problems of current collection, the mechanical structure of locomotives for high speeds, and the many elements which go to make up a successful and economical system of control for the electric power from the prime movers to the train wheels. There are thousands of men employed in the development of the science of electric railroading, and it is to these men that we shall be indebted for the final victories of the electrification of our railways.

Art of Electric Railroading.

The "art" of electric railroading includes the analysis of conditions and the selection and application of the available elements to a specific problem, as well as the operation and maintenance of the finished system.

It is the problem of the electrical engineer to select and balance all the elements of power generation, transmission and consumption in such a manner as to deliver the required quality and quantity of transportation with the greatest reliability and the lowest cost.

As set forth, the problem seems simple, but expe-

rience has indicated that very different conclusions are reached, both as to the methods which should be applied and the anticipated results. The problem is, in fact, extremely complex; so much so that it is almost impossible to retain in mind the many elements which must be simultaneously considered to reach a justifiable conclusion. Frequently one sees results cited, which on analysis are found to disregard entirely elements of the greatest importance.

A better comprehension of the situation can be obtained by outlining some of the elements which must be equated by the electric railroad engineer. We will assume that the problem as to schedules, train capacities, grades, etc., both for the present and the future, has been accurately set forth. For conditions requiring the use of motor-car trains and locomotive operation, there are available for consideration direct current and single-phase equipments or possibly single-phase for the motor cars and split-phase for the locomotives, with a further possibility of three-phase, if the problem involves the use of locomotives only. To reach the proper conclusion, every element from the prime movers to the train wheels must be considered.

Considerations of Power Supply.

In some sections of the country, in the Carolinas, Michigan, Montana, Washington, Oregon, and California, for instance, we find networks of power distribution which range from five hundred to two or three thousand miles of transmission circuits in each system. Generally in such localities, it is more economical for a railroad to buy than to manufacture its own power, since

this requires less capital expenditure, and the power companies which have the benefit of the factor of diversified load, can generally manufacture power for less cost. Where such conditions exist the frequency of the primary distribution is established by these systems. Where it is necessary for the railway to build its own power house, the question of frequency of current, with its bearing on the power already available in the territory to be served and the demands of the particular rolling stock selected, must be carefully investigated. Comparisons must be made between single-phase and three-phase power generation, due weight being given to the elements of initial cost, efficiency, power-factor, and protective appliances. Some of the problems, such as the desirable size of power-house units, their overload capacity, etc., are common to all systems.

Selection of Distribution System.

The distribution system is the simplest element in the chain, and can generally be worked out on its economic merits, as regards the selection of voltage, size of conductors, and the character of installation to conform to the distance of transmissions and permissible line regulations for the various systems.

Secondary Distribution and Substations.

The location and capacity of substations must be considered jointly with the secondary power distributions to the trains. This involves the selection of voltage; the determination of the permissible potential drops; provision for the mitigation of inductive interference with telephones and telegraphs for the single-phase and three-phase systems, or the consideration of the possi-

bility of electrolytic difficulties in case of the direct current, both for normal operation and for conditions of short circuits; the selection of third rail or overhead trolley; the effect of atmospheric conditions such as lightning, snow and sleet; examination of the reliability of the elements chosen, and decisions regarding the amount of line to be incapacitated when local repairs must be made. The selection of substation apparatus will be different for each system and will further vary with the frequency of power supply. The advisability of using transformers or auto-transformers with questions of capacity and regulation must be considered for the alternating-current systems; and with direct current there are questions of the relative merits of motor-generator sets, rotary converters or motor converters, with the determination of their normal and overload capacities and regulation. To make these different elements comparable, the selection of apparatus must be so balanced as to yield the same degree of insurance in case of the failure of individual elements or abnormal congestion of traffic, due to any cause.

Selection of Rolling Stock.

The item of rolling stock is by far the most important for consideration, as the proper selection of these elements is vital to the success of the system. Here the engineer is at once confronted with the consideration of the inherent features and costs of the various kinds of apparatus available; and due consideration must be given the relative values of constant versus variable speed, features involving the starting characteristics, efficiency of motors, conversion devices, control and

driving mechanisms, effects of inherent characteristics on power-load factors, electrical power-factors, etc.; besides all which, the desirability of regeneration and emergency braking require consideration, if mountain work is involved.

After having determined the first costs and rates of depreciation of each of the above elements, there remain two important items for consideration. The first is the analysis of power consumption, which can be carried through with reasonable accuracy for the particular conditions under consideration. The second is the problem of the determination of the operating and maintenance costs, which is more difficult. It is in these elements that the results of practice are most often lacking, and the value of an individual engineer's judgment will depend on his general experience, and on his ability to deduce from available data information which can be applied, when properly modified, to meet the specific problem in hand.

The Electrical Engineer's Problem.

The assembly of all these elements in the order of their respective merits is the problem before the engineer who is called upon to select a system for a particular application. It is not surprising that different results are reached by different investigators, due to the different weights assigned to the elements or to difference in the degree of optimism toward some of the unproved features.

Very often it is surprising to find how little difference there is in the initial costs of the various systems, as some of the elements tend to offset each other. For ex-

ample, the high cost of single-phase rolling stock equipment frequently offsets the greater cost of direct-current substations, while the additional weight of the single-phase equipments offsets the greater conversion losses of the direct-current substations, resulting in both the cost and power consumptions of the two systems being almost identical. Consequently with a greater quantity of rolling stock, the tendency is for the moderate voltage direct-current systems to be lowest in cost and cheapest to operate, while with few rolling stock elements the tendency is to relatively favor the higher voltage systems. For suburban electrifications a moderate direct-current voltage is generally the most economical, while for single track infrequent service, higher voltages are desirable.

Standardization of Systems.

A discussion of electric railway systems in the United States would not be complete without consideration of the standardization of systems. There is no doubt that standard third-rail and overhead trolley clearances are necessary to avoid serious interference with bridge girders, station platforms, and various structures existing along main railway rights of way.

About nine years ago, the Germanic countries, headed by Prussia, adopted certain arbitrary standards—that all main railways should be equipped with fifteen thousand volt single-phase trolleys, operated at sixteen and two-thirds cycles. At that time there was no experience available to justify such a selection, but it was believed by those in power to be desirable to have all efforts expended in one direction, and, furthermore, it was

deemed necessary for military reasons. Since then, it has developed that the limitations imposed are very adverse to economical motor car operation, that inductive interference with telephones and telegraphs under certain conditions is extremely serious, the low frequency involves difficult mechanical problems and practically bars out forever an economical design of induction motor for certain classes of service. These limitations have aroused some dissatisfaction in Germany; the Italian engineers have decided that three-phase is better suited to their conditions and the majority of engineers in England, Australia, Canada, France and Russia seem to favor direct current.

In this country we have done well to avoid a limitation, such as an arbitrary standard system of electrification would impose, since it leaves us free to work in every direction—whether it be single-phase, three-phase, split-phase, moderate or high voltage direct current, the mercury rectifier systems, or in any other direction which may be entirely unknown to us today. Arbitrary standardization of a system would mean limited development or stagnation.

Electrification of railways is desirable, not only from the standpoint of superior transportation, but on account of improvement in land values and the comfort and safety of travel. Although electrification is economically justified for many conditions, there are today no known systems sufficiently low in cost to permit universal use of electricity for railroads; and electrical engineers must therefore have a free hand in order to achieve the ultimate general application of electricity to

railway transportation, which it is confidently believed will come.

Electrification of Puget Sound Lines.

A notable example of recent electrification of railroads is seen in the case of the Puget Sound lines of the Chicago, Milwaukee & St. Paul Railway. Plans for the initial electrification of the first engine division, consisting of 113 miles of main line in Montana, between Three Forks and Deer Lodge, were completed early in 1915, and contracts were let with the General Electric Company for electric locomotives, substation apparatus, and line material, and with the Montana Power Company for the construction of transmission and trolley lines. This was the first step toward the electrification of four engine divisions extending from Harlowton, Montana, to Avery, Idaho, a total distance of approximately 440 miles, with about 650 miles of track, including yards and sidings. It was expected that the electrification would be extended in the near future from Harlowton to the Coast, should the operating results of the initial installation prove as satisfactory as anticipated.

The plans of the Chicago, Milwaukee & St. Paul Railway are of especial interest, as this is the first attempt to install and operate electric locomotives on tracks extending over several engine divisions, under which conditions it is claimed the full advantage of electrification can be secured. The various terminal and tunnel installations made in the past have been more or less necessary by reason of local conditions, but the electrification of the Chicago, Milwaukee & St. Paul is un-

dertaken purely on economic grounds, with the expectation that superior operating results with electric locomotives will effect a sufficient reduction in the present cost of steam operation to return an attractive percentage on the large investment required.

If the savings anticipated are realized in the electric operation of the Puget Sound lines, this initial installation will constitute one of the most important milestones in electric railway progress, and it should foreshadow large future developments in heavy steam road electrification. The success of electric operation on such a large scale will at least settle the engineering and economic questions involved in making such an installation, and will limit the future problems of electrification to the ways and means of raising the required capital to effect the change in motive power.

New Type Electric Locomotives.

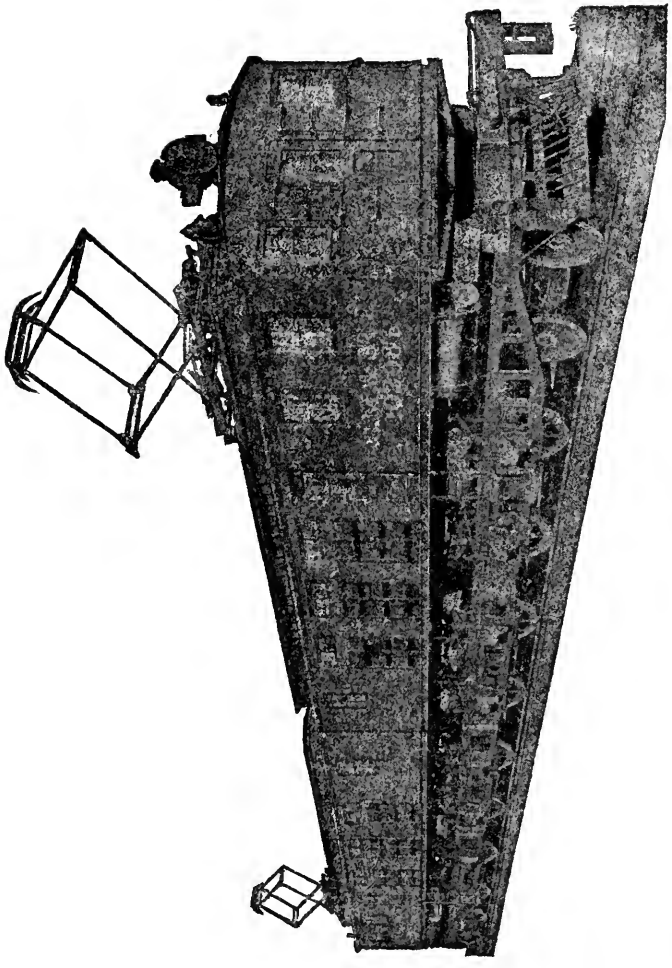
The electric locomotives manufactured by the General Electric Company for the Puget Sound lines are of especial interest for many reasons. They are the first locomotives to be constructed for railroad service with direct-current motors designed for so high a potential as 3000 volts. They weigh approximately 260 tons and have a continuous capacity greater than any steam or electric locomotive yet constructed. Perhaps the most interesting part of the equipment is the control, which is arranged to effect regenerative electric braking on down grades. This feature as yet has never been accomplished with direct-current motors on so large a scale.

The total length of each of these electric locomotives is 112 feet. They are equipped with eight motors and

have eight driving axles. The complete locomotive has a continuous H.P. rating of 3,000, a trailing load capacity of 2,500 tons on a one-per-cent grade, or 1250 tons on a two-per-cent grade. The approximate speed at these loads and grades is 16 miles per hour.

The freight and passenger locomotives are similar in all respects, except that the passenger locomotives are provided with a gear ratio permitting the operation of 800-ton trailing passenger trains at approximately 60 miles per hour, and are furthermore equipped with an oil-fired steam-heating outfit for the trailing cars. The interchangeability of all electrical and mechanical parts of the freight and passenger electric locomotives is considered to be of very great importance from the standpoint of operation and maintenance.

As the electric locomotive needs inspection only after a run of approximately 2,000 miles, requires no stops for taking on coal or water, or layover due to dumping ashes, cleaning boilers, or petty roundhouse repairs, it is expected that the greater flexibility of the locomotive with these advantages will result in considerable change in the method of handling trains now limited by the restrictions of the steam engine.



260-ton Electric Locomotive for the Chicago, Milwaukee & St. Paul Railway—Puget Sound Lines.

CHAPTER XXIV.

TRANSPORTATION BY AUTOMOBILE.

As a factor in the transportation of both passengers and freight in the United States, especially for short distances, the automobile or self-propelled vehicle has taken an important place since the dawn of the twentieth century. Its development has been indeed one of the marvels of modern progress in means of transportation, and also in the field of manufacturing industry.

In little more than twenty years the gasoline, or internal combustion, motor car has grown from an insignificant object of derision—the "horseless carriage" of the late '90s—to a practical necessity of modern social, business and industrial life. Its use for both business and pleasure transportation has increased so rapidly as to create a new era. The crude carriage that was a curiosity twenty years ago was the beginning of the greatest transportation aid that modern civilization has produced. It has broadened the horizon of many millions and has raised the standards of living among the American people, since its use is no longer confined to persons of wealth, but has been brought within the reach of the most moderate incomes; and the automobile industry is today among the most important industries in the United States, ranking after steel and iron and cotton in the list of our manufactures.

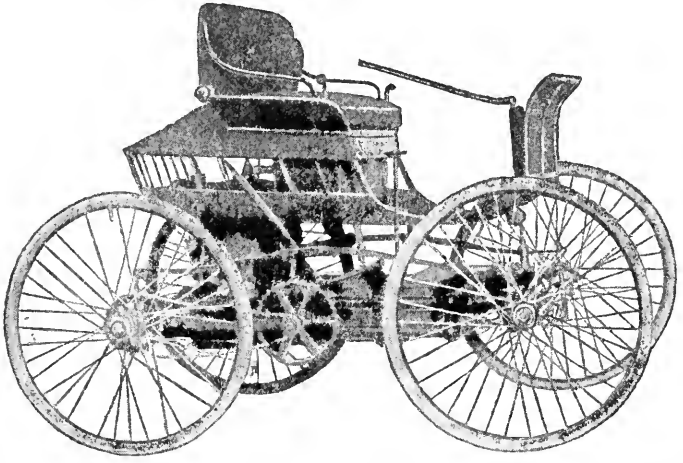
As a popular means of locomotion the automobile now has no rival. The streets and boulevards of our cities, the great highways and rustic roads throughout the country, are all fairly alive with motor cars of all grades and sizes, from the small, light car of trivial cost to the high-powered touring car whose initial cost runs well into the thousands. Between these extremes are to be found many machines of medium cost, capable of transporting from two to a dozen people on their daily trips to and from business, or on business or pleasure tours about the country, at the rate of speed of an ordinary railway train.

In the field of trade, for local transportation of merchandise, retail deliveries, etc., horse-drawn vehicles are rapidly being replaced by motor trucks and wagons. Great factories for the manufacture of motor vehicles have sprung up, some of these employing many thousands of men, and enormous fortunes have been rapidly made in the development of this new industry.

In many localities, and among certain classes of the population, the automobile has practically revolutionized transportation. It has given millions a new outlook upon life. To the farmer and his family it has been a decided boon, enabling them to have easier and more frequent communication with neighboring markets and centers of trade and population; thus making the life of the farm and the ranch more endurable, and probably having its effect in checking the tide of migration from the country to the cities.

One of the greatest benefits derived by the public from the increasing use of motor vehicles in town and country is found in the improvement which it has caused

in the construction and maintenance of both urban and rural highways. The development of a good roads movement all over the country has resulted in the building of hundreds of miles of improved roads in almost every State; in a marvelous extension of city boulevard



The Pioneer American Automobile. Designed and Built by Elwood Haynes of Kokomo, Ind. First run July 4, 1894. Now in the Museum of the Smithsonian Institution, Washington, D. C.

—Photo by Courtesy of Haynes Automobile Co.

systems, and in a general betterment of street pavements and public highways wherever the motor car is used. This movement has been of inestimable benefit, not merely to the pleasure rider or tourist, but to the agricultural community in every State where the prevalence of poor roads has hindered access to markets by making the transportation of farm products difficult, tedious, and costly.

The Automobile Industry.

As the third most important manufacturing industry

in the United States, the automobile industry, once regarded with suspicion by conservative bankers and investors, has won the approval and confidence of the business world. Its mushroom growth led for several years to reckless speculation and financing by manufacturers who were overwhelmed by the tremendous sudden popularity of the motor car and the excessive demand for a vehicle that was scarcely developed, from an engineering standpoint, as a reliable means of transportation. Recklessness of manufacturing methods and finance brought an inevitable result—the reckless manufacturers were forced out of business; their bankers then took hold to straighten out their tangled finances, and with the conservative element in the industry brought it to its present high standing.

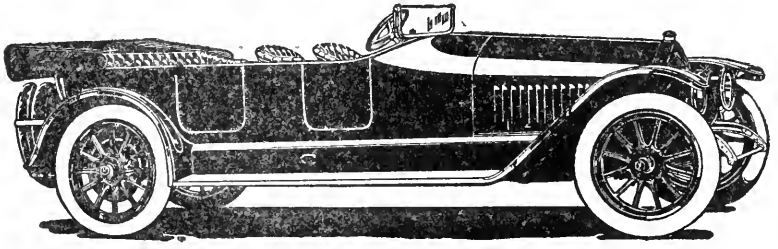
From the few rattletrap cars that participated in the first automobile road race in America—held under the auspices of the Chicago Herald in 1895—the business has so increased that the output of motor vehicles in this country during the present year, 1916, is estimated by authorities in the trade at from 1,000,000 to 1,200,000 and the value of this enormous product is placed at not far from $1,000,000,000.

There has been an increase in production by leaps and bounds every year. The number of cars turned out by American factories in 1905—ten years after the birth of the industry—was 33,896. In 1909 the production went far above the 100,000 mark—125,593.

Sixty thousand more were made in 1910. In 1911 the number was 209,957; in 1912 it jumped to 378,261; in 1913 the number approximated 450,000 and in 1914 there was an increase to 515,000 new cars.

The greatest jump in output in any year, however, was made in 1915, when 842,249 passenger automobiles and 50,369 motor trucks were sold in the United States. The retail value of this product was stated by the Automobile Chamber of Commerce as $732,600,000.

The European war was responsible for much of the motor truck manufacture in 1915-16, several truck



National Touring Car—National Motor Vehicle Co., Indianapolis.

manufacturers filling large orders for various sorts of vehicles ordered by the belligerent nations. The increase in passenger cars, however, and part of the increase in motor truck manufacture, were due to the rapid extension of the use of automobiles in American business.

One reason for this increase is that with improved engineering and manufacturing processes and larger production the automobile manufacturers have been able to turn out much better cars than formerly at much lower prices. With a great many users the automobile has passed beyond the luxury stage and become an absolute necessity.

Exports of American Cars.

In the upbuilding of the industry in this country, the

foreign trade has had an important bearing. In the early days, American cars did not suit those of unlimited means, who preferred cars of European make, and the French and German manufacturers shipped many cars to this country. But now the situation is different. American-made cars furnish everything that can be desired by the most fastidious owner or driver; the United States is exporting motor cars to nearly every country on the face of the globe, and the value of the cars imported is insignificant in comparison with the value of the exports.

The value of the automobiles imported by the United States in 1906 was $3,844,000, and the year after it went slightly above $4,000,000. In 1909 the imported cars were valued at only $2,905,000 and the figure sank gradually to $620,000 in 1914. In 1915 it rose to $1,372,412.

The export figures tell a different story; they travel an ascending line. From a value of $948,500 for the cars shipped out of the United States in 1903 the figure rose to $4,890,000 in 1907, to $9,548,700 in 1910, and to $26,574,000 in 1914; while for ten months of 1915 the value of American automobiles and automobile parts exported was $85,485,000, according to the figures of the Department of Commerce. The total for the year exceeded $100,000,000.

England is at present our best buyer of automobiles, taking for the year ending June 30, 1915, cars valued at $21,000,000, including 8,321 pleasure cars and 5,306 trucks. The total value of commercial vehicles exported in 1915 was approximately $63,000,000, and of passen-

ger cars $37,000,000. Exports of cars and trucks per month are at the rate of $8,500,000.

Extent of the Industry.

The birth of the automobile industry is usually dated from 1895, when it was signalized by the first automobile race, over the World's Fair course in Chicago. This race was won by J. Frank Duryea and Charles E. Duryea, in a car of their own make. There were eighty-nine entrants, but only six started, while only two finished. The time for fifty-five miles was 10 hrs. 28 min.

Compare with this the speed made in the same vicinity in 1915 by Dario Resta, who averaged 97.5 miles an hour, and subsequently raised the record to 105.4 miles an hour for 100 miles. Non-stop records too have jumped recently from 250 miles to 500 miles, new racing track construction being a contributing factor in these remarkable records of speed and endurance, as well as improved motors, mechanism, and tires.

The total number of cars in use in the United States demonstrates their importance as a factor in transportation. On July 1, 1915, there were registered, according to state reports, a total of 2,070,000 motor vehicles, while the total registrations for 1915 amounted to 2,400,000. The registrations in New York state on December 1, 1915, were 231,713 cars. Illinois registered nearly 200,000; California had 160,000; and in the leading ten grain states the registrations for 1915 showed a total of 677,000 cars. Iowa leads the states in per capita ownership, having a total registration of 117,407 cars, or one car for every nineteen persons.

Automobile factories were reported in 34 states of

the Union on January 1, 1916, with a total of 448 manufacturers of passenger and commercial cars. The commercial vehicle manufacturers numbered 257 and there were 27,700 retail dealers, garages, repair shops and supply stores. The chauffeurs registered in New York state number 79,899 and in Illinois 24,100. The proportion of motor vehicles to the population of the United States was 1 to 48, and there was one motor vehicle for every mile of road in the country, or one car to every one and one-third square miles of its entire area.

While the automobile production for 1916 is estimated at 1,200,000 cars, some of the manufacturers figure that there are 5,000,000 families in the United States with incomes permitting the ownership of a motor car. The demand for automobiles therefore seems a long way from being filled and a continued growth of the industry may be expected.

Reduction in Prices.

Big production of motor cars in the United States came with the standardization of the most important parts of cars in 1910, when the number of cars made reached 187,000. Scientific engineering, standardization of parts, skilled manufacturing, big production, and efficient selling brought the passenger car to an average price in 1915 of $672. The most popular low-priced car was marketed at about half that price, and had an enormous sale which caused the authorized capital of the manufacturer to be increased in 1915 from $2,000,000 to $50,000,000, the new stock going to the holders of the old shares as a bonus.

The average price of automobiles in 1899 (for steam runabouts) was $1,284. The average price in 1907 went to $2,123. Since then it has been steadily reduced.

The retail value of the cars and trucks sold in 1915 was $691,778,950, made up as follows: Passenger cars, $565,856,450; motor trucks, $125,922,500.

Freight carloads of automobiles shipped by American manufacturers in 1915 exceeded 200,000.

There are 2,273,000 miles of public road in the United States, and largely due to the automobile the great sum of $250,000,000 was spent on highway construction in 1915. Besides improving transportation by road, this also resulted in a tremendous increase in real estate values in the localities affected. In some localities this increase has amounted to from 100 to 400 per cent.

The number of miles traveled annually by motor vehicles in this country, estimating an average of 5,000 miles per car, is no less than 12,000,000,000. The amount of gasoline consumed annually, at an average of 400 gallons per car, is 980,000,000 gallons; while the lubricating oil consumed annually, averaging twelve gallons per car, is 28,800,000 gallons.

There are 12,000,000 tires used annually on the motor cars of the United States, these being of 125 different brands and of 140 types and sizes.

Keen competition in the automobile industry brought failure during the last five years to about 400 manufacturers.

Regulation of Automobiles.

Automobiles pay registration fees in all states, and personal property tax, in addition, in all but four states. Many states also require and charge for a driver's li-

cense, while others have a wheel tax. More than $7 per car was paid in motor vehicle fees for registration in 1915, or a total for the United States exceeding $14,000,000.

Laws and ordinances for the regulation of automobile traffic exist in the various states, cities, and rural districts. These usually prescribe a limit of speed which shall not be exceeded by drivers, under a penalty, and also set forth rules of the road for motor vehicles. The speed limits vary according to the nature of the locality and the spirit of the community. In the larger cities accidents involving loss of life to pedestrians and motorists are still distressingly frequent, but a recent tendency toward "safety first" is observable in all populous centers, and restriction of motoring to a reasonable and safe speed under all conditions is now strongly urged upon drivers by the automobile clubs and associations, as well as by local authorities in all parts of the country.

Features of Up-to-Date Cars.

The modern automobile of average cost is lighter, better equipped, more beautiful and more comfortable than its predecessors in the brief process of evolution. Nearly all manufacturers now adhere closely to established principles of design, motors are more reliable, and valves generally are better. Improved starting and lighting systems, electric gear shifts, etc., have done much to increase ease of operation and the comfort of drivers. Most engines are water-cooled, but the air-cooled motor cars of a great manufacturer are both successful and popular. The "gearless" car has arrived, silent "sliding sleeve" motors are in extensive use, but most of the changes in model now made by manufactur-

ers are in the direction of improving details of construction rather than radical changes of design.

Automobile engines are now mostly of the four-cylinder and six-cylinder varieties. About 11 per cent of the models shown (not of cars manufactured) in 1916 were of eight-cylinder design, and twelve-cylinder engines appeared for the first time in 1916.

The average horse-power of the 1916 models was 28.66. In 1915 it was 29.77.

The limit of motor construction for the automobile appears to have been reached, so far as the number of cylinders is concerned. Experimental and research work has fully convinced American engineers that a small-bore, high-speed motor is to be the final answer in motor car construction. European engineers have already adopted this theory. The smaller bore of the cylinder permits the use of higher compression, and the higher the compression the more efficient is the burning of the gases at all speeds. Naturally the question arises, to what extent can this be carried out?

There are various reasons, according to the experts, why more than twelve cylinders will not be employed in the construction of automobiles. The principal reason is that the greatest efficiency is reached with this motor, not only from the engineer's standpoint but from the standpoint of the man behind the wheel.

Automobile No Longer a Mystery.

The air of mystery which surrounded the automobile in its early days has been dissipated by the simplicity of its operation, and increased knowledge of its construction.

There is no longer the impression in the minds of buyers and users that the motor car is a complex combi-

nation of parts which only one well versed in engineering can safely own. And yet the simplicity of the automobile is largely due to the association of numerous smaller machines into a harmonious unit.

The motor car of today resembles the original horseless carriage—which Elwood Haynes placed upon an Indiana highway in 1894—only in the fact that it is motor driven. (The pioneer Haynes one-cylinder machine is now preserved in the museum of the Smithsonian Institution at Washington.) The history of every mechanical development has been "from crude directness at the start to extreme and burdensome complexity; then to a finished simplicity which made the complex designs seem absurd." It was logical that the automobile should go through stages of development in that respect, following the general rule of mechanical history and working back to a permanent condition of simplicity.

The question of the number of cylinders for an automobile engine will be finally settled by the people who buy automobiles, and their decision will be properly influenced by the cost of operation plus depreciation. The simpler any mechanism, the cheaper it is to operate and care for. Therefore it would seem that any tendency toward a large number of cylinders in automobile engines is likely to be followed by a return to a policy of fewer cylinders, because of this greater simplicity and the resulting economical advantage.

Official figures show that close to 2,400,000 motor cars were licensed in this country in 1915, and it is conservatively estimated that at least one million persons are driving their own cars. Of these persons probably not one in ten knows much about its mechanism. Such a

condition is bound to have an important influence in the future design of motor cars.

It is a condition which means a tendency toward greater reliability in automobiles; simplicity in design and construction—the smallest possible number of things to look after and care for.

Electric Vehicles Popular.

Recent changes and improvements in the electric vehicle industry point to a bright future for the electric in the commercial field and as a passenger car. The popularity of the electric car has been of gradual, steady growth in recent years, and it is now firmly established in public favor.

The electric motor car is an especially desirable and economical vehicle for city and suburban transportation. An important recent development in a special field is its adoption for municipal service, in one form or another, by many of our most progressive cities. Still another development seen in the cities is the electrically driven taxicab.

Increasing Use of Motor Trucks.

There are now (1916) in use in the United States more than 200,000 motor trucks, or ten times as many as at the beginning of 1912. The present output of American factories for American use is at least 75,000 trucks a year, with a value of $120,000,000; and the demand exceeds the supply.

In the motor truck market there is a greater range of models and prices than there is in the pleasure car field. Besides the conventional rear-wheel driven types there are front drive and four-wheel drive models, as well as the six-wheel semi-tractor and trailer.

A review of the motor-truck manufacturers shows 221 makers of gasoline trucks, twenty-four electric wagon concerns, and two making steam trucks. Between them they list no fewer than 462 different models —407 gasoline, fifty-three electric, and two steam.

A significant sign that the vogue of the motor truck is country-wide is the fact that these manufacturers are located in thirty-one different states, ranging from Massachusetts to Texas in the east and south, from New York to Minnesota in the north, and including Washington, Oregon, and California in the extreme west. Michigan leads with 41 manufacturers of trucks, while Ohio has 31, Pennsylvania 25, Illinois 20, Massachusetts 13, Indiana 12 and Wisconsin 11.

Motor truck buyers today pay less attention to the engineering details of the machine than they do to its economy and efficiency in the particular kind of transportation for which the truck is intended. The ability of the truck to deliver the goods the maximum number of working days under all kinds of road and weather conditions—this is the prime consideration with the well-informed buyer, the merchant who has to move goods. When the lessons of the European war are finally tabulated, not the least important will be the part played by the motor truck. The dependence upon gasoline traction will be emphasized as never before, and the lessons taught by war will be turned to account in improved design and construction of motor wagons and trucks to serve the arts of peace.

QUESTIONS FOR REVIEW.

TRANSPORTATION—INTERSTATE COMMERCE—FOREIGN TRADE.

CHAPTER I.

The History of Transportation.

1. Who first suggested the building of a railroad, and when?
2. What treatment did he receive?
3. When was the first railway in America constructed?
4. What railroad was it?
5. How and when was the present New York Central system inaugurated?
6. In what year was communication by rail between New York and Buffalo established?
7. What State followed New York in railway development?
8. Who were the builders of the first American locomotives?
9. What part have railways played in the development of the country?
10. Between what years was the greatest amount of railroad building done in America?
11. What main purpose was involved in the construction of the first transcontinental route?

12. How did rates on the pioneer railroads compare with those in effect today?

13. In what time could the journey from Philadelphia to Pittsburg be made by rail in 1837?

CHAPTER II.

Organization of Operating Force.

1. On what plan is the operating staff of a railroad organized?

2. Cite the system in effect on the Union Pacific.

3. Who is at the head of the operating staff?

4. How many departments report direct to this official?

5. What are the duties of a General Superintendent?

6. By what means does he keep in close touch with the operation of his road?

7. To what extent does a Division Superintendent have authority?

8. Is the General Freight Agent subordinate to the General Manager; and if so, how?

9. What are the duties of a General Passenger Agent?

CHAPTER III.

Relations of Carrier and Shipper.

1. Is there any difference between carriers by rail and water as regards their liability to shippers?

2. Which carrier assumes the greatest amount of responsibility?

3. Under what conditions are railroads exempt?

4. What must a carrier by rail do to protect a shipper?

5. Is a railroad responsible for losses by fire while goods are in transit?

6. When does the liability of a carrier by rail terminate?

7. What is the difference between the old and the modern system of forwarding goods?

8. Under what conditions does responsibility attach to shippers?

9. What is the general liability of a carrier by water?

10. How is this liability limited?

11. Do the Federal statutes define the liability of carriers by water?

CHAPTER IV.

What Is a Reasonable Rate?

1. Is there any fixed plan by which a reasonable rate may be equitably determined?

2. Is the basis of "a fair rate on the capital invested" satisfactory?

3. What difficulties, if any, exist in establishing the actual cost of railway construction?

4. Has any practical plan been put into effect?

5. What is the position of the United States Supreme Court on this subject?

6. Can the Federal Supreme Court deal with the legality of rates fixed by the various States?

7. How would an attempt at a rate-reduction affect the general rate schedule?

8. Is the Constitution violated by making rates so low as to be unprofitable?

CHAPTER V.

Domestic and Foreign Rates.

1. Is there a tendency on the part of railroads to reduce freight and passenger rates as business increases?

2. Cite the difference in passenger rates for journeys of similar length in the United States and England.

3. Name the average passenger rates now in effect in the principal civilized countries.

4. What country has the lowest rate, irrespective of class of service?

5. What is the general tendency of freight rates, upward or downward?

6. What appreciable effect would there be in a ten per cent increase in freight charges?

CHAPTER VI.

Classification of Traffic.

1. Why do railroads classify their freight traffic?

2. Is the plan now in effect entirely satisfactory?

3. On what basis is classification made?

4. To what extent, if any, is locality a factor in determining the classification of freight?

5. How are rates affected by this classification?

6. Name the rates in effect on each class between New York and Chicago.

7. How is the minimum capacity of a car fixed upon?

CHAPTER VII.

Uniform Bill of Lading.

1. In what year and under what conditions was the uniform bill of lading adopted?
2. Does any particular advantage accrue to shippers under the new system?
3. What was the defect, if any, in the old form?
4. Name the principal features of the uniform bill.
5. Of what particular advantage is it in banking transactions?
6. What liability does a carrier by rail assume under the uniform bill of lading?
7. How may shippers utilize the uniform bill of lading in raising money?
8. What is a milled-in-transit bill, and of what benefit is it to a shipper?

CHAPTER VIII.

Private Cars and Fast Freights.

1. What class of shippers own private freight cars, and why?
2. Under what arrangement do the railroads handle these cars?
3. What advantage is there to a shipper in the ownership of freight cars?
4. Do the railroads benefit by this system, and if so, how?
5. How did the private car system originate?
6. What was the beginning of the fast freight service?
7. How is this service operated?

CHAPTER IX.

Some Transportation Problems.

1. What is the comparative transportation power of man, horse and locomotive?

2. Which country gives the best and most economic transportation service?

3. Is there a Federal law against discrimination in rates?

4. When did it originate, and under what circumstances?

5. What is the effect of competition between large carriers?

6. Is there any benefit in the combination system?

7. Name three plans that are suggested by railway men for obtaining relief from the effects of unrestricted competition.

8. Can "pooling" be legalized without advancing rates unfairly?

9. What benefit, if any, is there in unification of transportation interests?

10. What effect has improvement in our railway service had upon rates?

11. Cite some of the objections which are raised against government ownership.

12. Is there necessity for government control which does not include government ownership?

13. How does England limit railway construction so as to avoid ruinous competition?

CHAPTER X.

Railways as Industrial Factors.

1. When did the manufacturing industry of America begin to attract attention?
2. What has been the main factor in the development of this industry?
3. Have railroads any interest in the development of communities and business interests?
4. How have our American railroads operated to secure increase in traffic along their lines?
5. In what way do the immigration bureaus of our railroads assist in developing traffic?
6. Why do railways give particular attention to the development of manufactures?
7. How are business men located along various railway lines educated to assist in the development of their communities?
8. Cite instances in which profitable industries have been established in the West and Northwest through railroad influences.
9. When and how was the first paper mill established in Wisconsin?

CHAPTER XI.

Training of Railway Mechanics.

1. What large railroad system maintains a systematic course of instruction for its mechanical employes?
2. Under what conditions are apprentices received?
3. Of what benefit is this system to the road and the apprentices it receives?

4. Give an outline of the course of instruction, and method of rewarding diligent pupils.

5. Are there any physical and mental qualifications necessary to the acceptance of an apprentice? If so, name them.

6. What is the advantage of the indenture system as maintained by this particular railroad?

7. What is the scale of wages paid to apprentices?

CHAPTER XII.

Railroad Situation in Canada.

1. What has Canada done toward the construction of railroads?

2. Is the Canadian policy liberal or otherwise?

3. How much money has Canada expended in the construction of government-aided lines up to the present time?

4. By what other means does the Canadian government aid in the construction of railroads?

5. Which country has the largest railway mileage—Canada or Great Britain?

6. What was the total Canadian railway mileage on the 1st of January last?

7. Cite an example as to the density of population per mile of railway in Canada, Great Britain and the United States.

8. What is the total capitalization of Canadian railways, and what does it average per mile of road?

9. How many passengers and how much freight did the Candian railroads carry during last year?

10. What were the gross earnings of these roads last year, and how did they compare with the preceding year?

11. What were the operating expenses of the roads last year?

12. How many people are employed in railway work in Canada?

13. What is the total amount of their salaries and wages, and how does the rate of pay compare with that prevailing in the United States?

CHAPTER XIII.

Railway Mail Service.

1. When was carriage of mail first established in the United States?

2. What was the speed per hour?

3. What is the present highest speed of our modern fast mail trains?

4. When was the first special mail service inaugurated, and under what conditions?

5. When, and over what route, was the first regular mail service established?

6. What abuses, if any, existed in the old distributing office system?

7. Who was the original suggestor of the railway postoffice?

8. When and between what points was the distributing system now in effect first inaugurated?

9. Who introduced the fast mail train system, and over what roads were these trains operated?

10. What were the results of the first efforts to establish this system?

CHAPTER XIV.

Transportation by Express.

1. When, and by whom, was the express business started?
2. What large companies have grown out of the efforts of one man?
3. What are the general terms of the contract under which express companies operate on railroads?
4. What is the main source of express revenue?
5. How do express companies regulate their charges for the transportation of valuables?
6. Is there a limit to the amount for which an express carrier is liable? If so, what is it?
7. Why is care necessary in determining the value of packages?
8. Describe the nature of what is known as C. O. D. business.
9. What makes this business of special value to the express carrier.
10. What particular business, akin to banking, is transacted by express companies?

CHAPTER XV.

Railway Crop Report Bureaus.

1. What class of railroads make a feature of compiling crop reports?
2. In what manner is the information obtained?
3. Describe briefly the method of compilation.
4. What is the purpose of securing and tabulating crop news?

5. What classes of people are benefited by this service?

CHAPTER XVI.

Fixing Value of Railroads.

1. What constitutes the value of a railroad? Is it the cost of construction, or the earning power of the road?

2. What important things should be kept in mind in determining railroad values?

3. Name the effect of railroad valuation on investors.

4. How may fair valuation be made?

5. Is there any difference between "fair value" and "cost of reproduction"?

6. In what manner have the Federal courts ruled upon the question of railway valuation? Cite an important instance.

7. Name some of the important items usually ignored in the appraisal of railroad property.

8. What is the general policy of railroad managers in the betterment of the properties under their charge?

CHAPTER XVII.

Interstate Commerce Act.

1. In what way does the Interstate Commerce Act affect railway rates?

2. On what basis must common carriers subject to this act regulate their charges?

3. Is discrimination in rates as between shippers allowable?

4. Is there any legislation as to long and short haul rates? If so, what is the effect?

5. How are schedules of rates to be made public?

6. Must these schedules be adhered to?

7. To what extent are carriers by rail liable for damages, and how may these damages be collected?

8. What is the punishment for violation of the provisions of the Interstate Commerce Act?

9. Under what conditions are shippers liable to punishment, and to what extent?

10. Describe the authority and powers of the Commission.

11. In what event may recourse be had to the courts?

12. How often must common carriers by rail report to the Commission, and what should these reports contain?

13. What courts have jurisdiction of cases involving violations of the Interstate Commerce Act?

14. What provisions, if any, are there for the use of safety appliances?

15. Does an employee, injured in consequence of the failure of a carrier to comply with the law, lose his right to damages if he knowingly and willingly assumes the risk thus occasioned?

16. What limitations are there on Federal telegraph franchises granted to common carriers?

17. What is the duty of the Attorney-General in case of violation?

18. Must contracts between railroad and telegraph companies, relating to ownership, possession, control, use and operation be filed with the Interstate Commerce

Commission? What is the penalty for failure to comply with this provision?

19. What is the bearing of the act in relation to trusts and combinations?

20. What punishment is provided for engaging in an illegal trust or combination?

21. What courts have jurisdiction of such cases, and to what extent?

22. Can a person injured by an act committed by a common carrier in violation of the terms of the Interstate Commerce Act recover damages?

23. How is the giving and taking of bribe money punishable?

24. Are common carrier corporations liable for the acts of their agents and other employees?

25. What method of procedure is provided for violation of rate schedules or other acts of discrimination?

CHAPTER XVIII.

Transportation by Water.

1. Give total number of passengers carried on water routes in the United States in one year.

2. What is the general character of freight transportation by water?

3. What should be done to improve our present system of transportation by water?

4. Give the navigable mileage of inland river routes in the United States.

5. Of canals.

6. What is the main drawback of the American canal system?

7. Describe the policy of the Federal government toward waterways.

8. What is the nature of Federal improvement work?

9. Which is the cheapest for the shipper, water or rail transportation?

10. How are vessels engaged for the carriage of freight?

11. To what extent does the Federal government exercise control over vessels on inland waters?

12. What are the rates for marine insurance?

13. Do the various States tax marine property? If so, in what manner?

14. What constitutes navigable water?

15. What is the Mississippi River problem?

16. Name the principal items and magnitude of lake commerce.

17. What are the four principal Atlantic ports?

18. Give total tonnage of receipts and shipments at the principal Atlantic and Gulf ports for one year.

19. What conditions have enabled railroads, charging higher rates, to displace water transportation?

20. Name the four principal ports on the Pacific coast.

21. What commodity constitutes the largest item of transportation on the Pacific coast?

CHAPTER XIX.

Lakes-to-the-Gulf Waterway.

1. Is there need for a deep waterway connecting the great lakes with the Gulf of Mexico?

2. What section of the United States would be most directly affected by such a route?

3. Give reasons why this section is particularly interested in such a waterway.

4. What benefits would be obtained by the construction of a great central deep water route?

5. What class of goods suffer the most from lack of a through deep water route?

6. To what extent does waterway competition affect freight rates by rail?

7. What effect does water and rail competition have on the bulk of business?

8. How is the producer limited as to market area by lack of water transportation?

9. How would a lakes-to-the-Gulf waterway figure in our trade with Central and South America?

10. What business relation would exist between the Panama Canal and a waterway to the Gulf, provided the latter were constructed?

11. What advantage would such a route have over that now used?

CHAPTER XX.

Vessels in Foreign Trade.

1. Why does the Federal government keep a record of vessels engaged in foreign trade?

2. What is the significance of a "ship's papers"?

3. What vessels can be registered in the United States?

4. What benefit, if any, attaches to the registration of a vessel?

5. How is the identity of a vessel established?

6. Under what conditions may a vessel's name be changed?

7. How is registry effected?

8. Can a foreigner command a vessel of American registry?

9. What is "the husband" of a vessel?

10. How is the tonnage capacity of a vessel accurately decided upon?

11. Describe the method of measuring a vessel.

12. Is there any reason for the tonnage of a vessel being accurately stated? What is it?

CHAPTER XXI.

Work of the Custom House.

1. What routine must be observed by vessels departing from ports of clearance?

2. Of what service is the clearance paper?

3. What is a ship's manifest, and what should it contain?

4. What course should be taken by the master of a vessel on arriving at a port of entry?

5. Is there any limit to the time allowed for unloading vessels? If so, what is the rule?

6. Describe the process of importing foreign goods.

7. What papers is it necessary for an importer to have?

8. Must duties be paid immediately on inspection of goods?

9. If not thus paid, what course may an importer pursue?

10. In the event of his placing the goods in bond, how long may they remain there before the duty must be paid?

11. What is the penalty for making false return as to valuation of goods?

12. May imported goods be re-exported without payment of duty?

CHAPTER XXII.

The Bonded Warehouse.

1. Why are bonded warehouses established?
2. Of what benefit are they to shippers?
3. What kind of goods are placed in bond?
4. How is a warehouse entry made?
5. Of what particular value is a warehouse receipt?
6. Is there a punishment for wrong valuation? If so, what is it?
7. What is the duty on imported goods in bond which are withdrawn for re-exportation?
8. How are such goods kept track of after being re-shipped?
9. What is the rate of storage charges?

CHAPTER XXIII.

Electric Railways of the U. S.

1. How many miles of electric railways are there in the United States?
2. From what year does their period of development date.

3. How many passengers did the electric railways transport last year?

4. How does the competition of electric railways affect the steam roads?

5. What are the prospects for general electrification of the steam railroads?

6. What are the chief characteristics, etc., of an electric locomotive?

7. What steam railroad was the first to electrify a large portion of its mileage, and what was the result of the experiment?

8. Name some of the engineering problems in equipping an electric road.

9. What type of passenger car is generally used in city traffic?

10. What type of car is best fitted for interurban service?

11. How do the electric railways of the United States compare with foreign systems?

CHAPTER XXIV.

The Automobile in Transportation.

1. How many licensed automobiles are there in the State you live in?

2. About how many people are using automobiles daily in the United States?

3. How has this diversion of traffic to automobiles affected railroad and steamboat lines?

4. To what extent has the automobile become more than a pleasure vehicle?

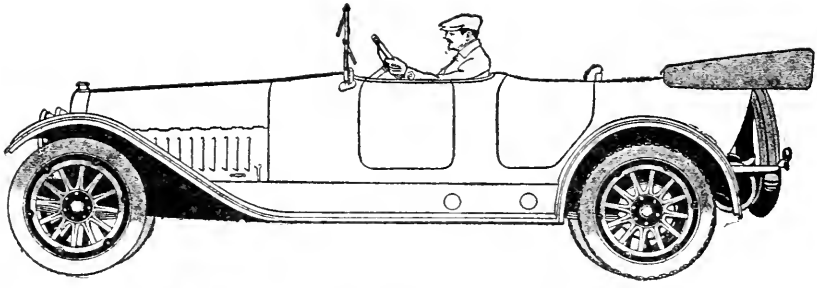
5. Has it received any attention from business men as a vehicle for freight transportation?

6. Cite average cost per ton per mile of operating a two-ton gasolene freight truck.

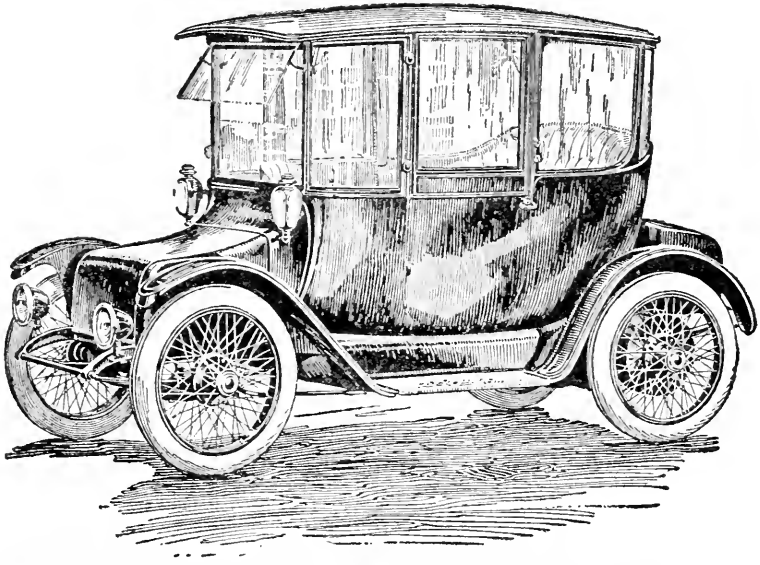
7. What is the average efficiency of a gasolene motor truck, as compared with horses?

8. What will be the difference in the daily cost of feed for four horses, and fuel for a gasolene truck of four-horse capacity?

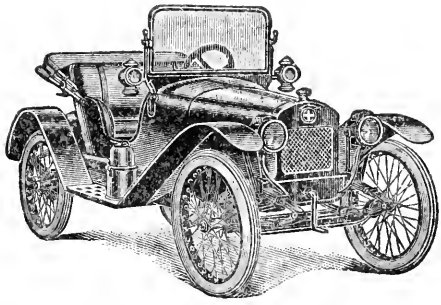
9. How many automobiles were made in the United States last year?



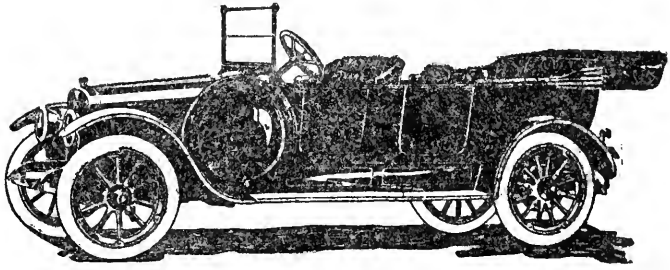
Mitchell 6-Cylinder 7-Passenger 48 H. P. Motor Car.
Mitchell-Lewis Motor Co., Racine, Wis.



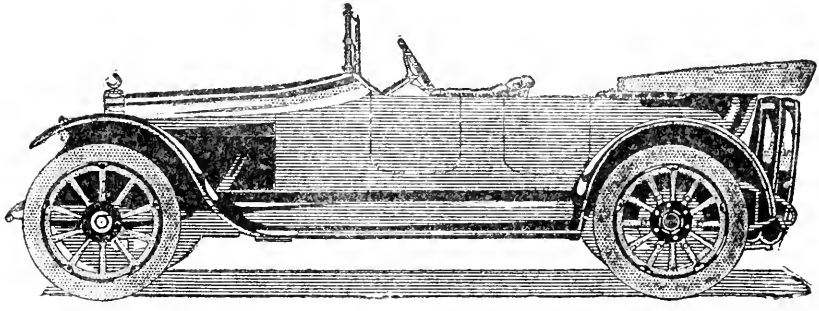
Detroit Electric Car—1916 Model—Anderson Electric Car Co., Detroit, Mich.



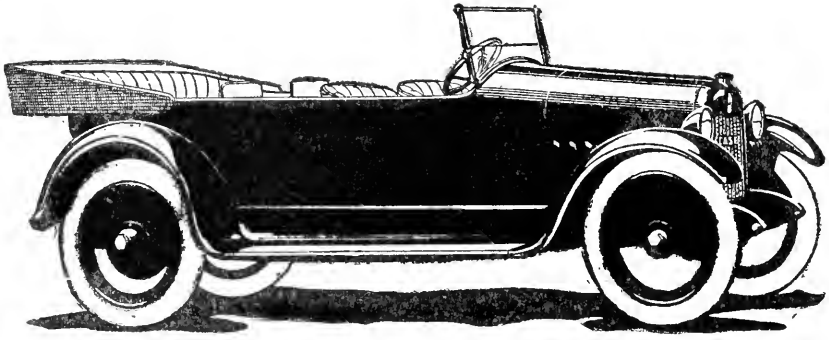
The Galloway Automobile—A Low-priced Car Introduced in 1915 by The William Galloway Co., Waterloo, Iowa.



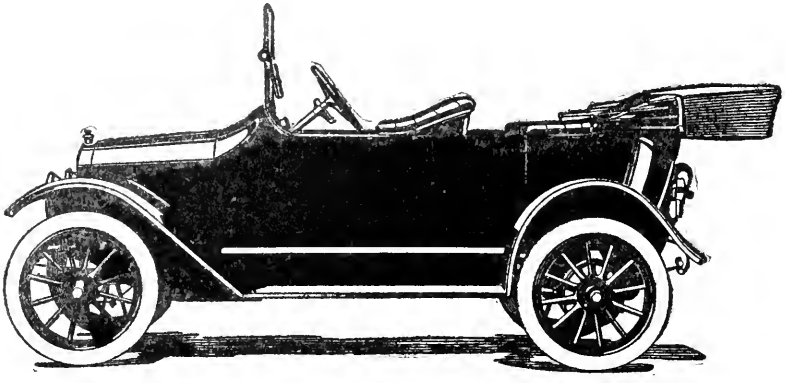
Hudson Six—40 H. P. Phaeton—Hudson Motor Car Co., Detroit, Mich.



Moon Six-Cylinder, 40 H. P. Motor Car, 1916 Model.



Case 40—1916—Model T Touring Car—J. I. Case T. M. Co.,—Racine, Wis.



Maxwell Touring Car—Maxwell Motor Co., Detroit, Mich.

TERMS USED IN TRANSPORTATION.

BARGE—Water craft which has no means of propulsion within itself and must be towed. A very considerable business is done by barges, especially on rivers like the Ohio, Missouri and Mississippi.

BULK FREIGHT—Commodities like grain, iron ore, coal, etc., which are carried in bulk without being put up in containers.

CANAL—An artificial waterway. Generally a route constructed to either lessen the distance between certain points or to afford water connection where none previously existed.

CARGO INSURANCE—This is generally paid for by the shipper of goods, and always so if the vessel is under charter.

CHANNEL—The deepest part of a navigable body of water.

CHARTER—A contract by which the exclusive use of a vessel is secured for a certain purpose.

CLASSIFICATION—Division of freight into classes so as to secure equitable rates according to the nature of the goods. The cheaper the goods the lower will be the classification, with a corresponding reduction in the freight rate.

C. O. D.—A shipment of goods to be paid for on delivery.

COMMON CARRIER—A corporation, firm or individual engaged in the transportation of people or goods for the benefit of the general public.

COMMUTATION—A process by which the patron of a transportation line by agreeing to use a stipulated amount of mileage within a given time secures a rate much lower than the ordinary one-ride charge.

COMMUNITY OF INTEREST—Unification of transportation lines, either by general ownership, or consolidation of management, with the purpose of eliminating disastrous competition.

CONSIGNEE—The party to whom goods are addressed.

CONSIGNOR—The party who delivers goods to a transportation line to be forwarded to another party.

DEMURRAGE—Compensation paid by transportation lines to shippers for the delay or detention of goods. Likewise compensation paid by shippers to transportation lines for the detention of cars or vessels.

DIFFERENTIAL RATES—Special rates made for hauls of approximately the same distance with the purpose of diverting traffic to or from certain points.

DIFFERENTIAL ROUTES—An advantage in rates allowed to certain roads which, by reason of longer route, poor roadbed or equipment, or other cause, are unable to compete with the first-class lines on even terms.

DRAWBACK—Refund of duties on goods which are to be exported, or of excess freight charges.

DRAWBAR—That part of a locomotive or railway car to which the coupling is fastened. A standard height for drawbars is established by law in order to minimize the risk of accident.

DUNNAGE—Frequently used to denote the luggage or baggage of employees and passengers. More properly the packing used to keep a cargo in place while in transit.

GAUGE—Width of track. There are three gauges in use in the United States and Canada—the narrow, broad and standard. The latter, which is in almost universal use, is 4 feet 8½ inches wide. This allows of an interchange of cars by all roads except those of broad and narrow gauge.

HEAD-ON COLLISION—When two trains, moving in opposite directions, collide, the front or "head" end of each engine meeting.

HULL INSURANCE—Insurance on the hull of a vessel. This is taken out by the owners of the vessel.

HUSBAND OF A VESSEL—The managing owner or controller of the largest ownership share.

INTERSTATE COMMERCE—Goods passing from one State to another. Traffic wholly within the boundaries of a State is not affected by interstate commerce regulations; but if this traffic crosses the State boundary by the fraction of a foot the interstate commerce regulations apply.

JOINT RATE—Rate made on through shipments by two or more roads, movement over each of which is necessary to complete the journey.

MANIFEST—Invoice of a cargo of goods to be shown at the custom house.

MILEAGE—The basis on which all fares and freights are computed.

MILLED-IN-TRANSIT—Arrangement by which grain may be stopped in transit and ground, and then re-

shipped at the rate prevailing between the points of original shipment and ultimate destination.

MINIMUM CAPACITY—Minimum of load capacity for which the use of a railway car may be obtained. If a shipper desires the exclusive use of a car he must pay freight on the minimum load capacity, even though he does not use that minimum capacity.

NAVAL STORES—Turpentine, pitch, resin, etc. So called because in the days of wooden hull vessels the greatest use for these materials was in ship building and repairing.

NAVIGABLE WATER—Any stream or body of water on which traffic incident to that particular locality may be conducted. There is no standard of depth, width or capacity. In some instances streams on which logs could be floated have been declared navigable waters because logging was the chief industry on the stream.

NON-COMPETITIVE POINT—Points which can be reached by only one route. If more than one transportation line reaches the same place it is designated as a competitive point.

PACKAGE FREIGHT—Commodities like flour, sugar, fish, etc., which are put up in containers like barrels, boxes or bags.

PHYSICAL PROPERTY—Actual, tangible effects like vessels, locomotives, railway cars, buildings, machinery, roadbed, etc. The right-of-way and good will of a railway may be of more actual value than its physical property, but they do not count as such.

PORT OF ENTRY—Seaport at which a customs service is maintained for the purpose of expediting the collection of duties on imported goods.

PORT OF CLEARANCE—Seaport from which a vessel "clears," or starts on its voyage.

PROPELLER—Vessel, the motive power of which is furnished by a propeller or "screw" at the stern. Now in almost exclusive use on deep waters.

REAR-END COLLISION—When two trains moving in the same direction collide, the engine of one train running into the rear coach of the preceding train.

REGISTRY—Official record by the government (all civilized countries), giving a complete description of a vessel for identification purposes.

REVENUE—The money earned in the transportation of goods or passengers. Also used to designate the income from investments.

RIGHT OF WAY—Term used by train dispatchers to give certain trains precedence over others when not running on a regular time schedule. Also used in construction work to designate the territory or land secured by a railway for roadbed purposes.

SALVAGE—Goods saved from loss or damage in railway or marine disasters.

SIDE-WHEELER—Vessel with propelling wheels on the side. A type now fast disappearing because the more modern propeller or screw craft is easier and more economical to operate.

STERN-WHEELER—Form of boat used on shallow streams of tortuous current, like the Mississippi. The motive power is obtained from a large wheel at the stern of the craft.

SWITCHBACK—A system of zig-zag tracks so arranged that by running forward and backward alternately a train is enabled to climb an otherwise insurmountable grade.

TARIFF—A schedule of charges for the transportation of goods or people. In the freight line there is generally a special tariff for every commodity in the movement of which there is an unusually large business.

TELESCOPING—When trains or engines meet in collision and are forced through, or partly through, one another.

TERMINALS—The ends or extremities of a transportation line. New York and Buffalo are the terminals of the New York Central road.

THROUGH FREIGHT—Goods bound to the terminal of a transportation line. Goods shipped by the Michigan Central from Chicago to Buffalo would be through freight because Buffalo is a terminal of the road. The same goods shipped to Buffalo over a road running through to New York would be way or local freight.

TOLL—Charge made for the use of canals. The amount is regulated by the tonnage of the vessel.

TONNAGE—Generally used to designate the cargo capacity of vessels. Also used to designate their size. There is a great difference in displacement and tonnage capacity. A vessel of 3,000 tons size or displacement, may not have a cargo capacity of 2,000 tons. It depends upon the style of interior construction. Tonnage is also employed by railway men in expressing the amount of freight hauled. The usual expression is, "The tonnage in February was 10,695."

TRAIN DISPATCHER—The official who sends out trains and directs their movements while in transit.

TRAIN MILEAGE—The mileage travelled by train in contradistinction to car mileage. Thus a train of ten

cars would have a mileage ten times greater than one car travelling the same distance.

TRAIN ORDERS—Instructions by wire for the movement of trains. These are invariably issued by the train dispatcher.

TRAIN SCHEDULE—The time card by which the movement of trains is governed.

TRAFFIC—Goods or passengers carried by a transportation line. Thus, if an unusually large amount of corn (or other grain), is being shipped it is customary to speak of it as a heavy corn traffic.

TRANSSHIPMENT—Reshipment from one carrier to another. Goods bound from Chicago to Liverpool are transshipped from car to vessel at New York, or some other Atlantic seaport.

TRUNK LINES—The great main railway systems which, with their branches and auxiliaries, are in position to be operated successfully without depending upon other lines. Such systems as the New York Central, the Pennsylvania, Union Pacific, Santa Fe, Baltimore & Ohio, Erie and Illinois Central are trunk lines.

WATER-AND-RAIL ROUTE—A combination of rail and water transportation. The Lackawanna railway, for instance, is a water-and-rail line. It carries bulk cargoes like grain from Chicago to Buffalo by lake steamer, and at Buffalo transfers the cargoes to trains bound for tidewater.

WHARFAGE—Fee charged at most ports for the use of a dock or wharf. Some cities, in order to encourage the shipping industry, give free wharfage, but in most instances the use of docks must be paid for.

"Remember that man's life lies all within this present, as it were but a hair's-breadth of time; as for the rest, the past is gone, the future yet unseen. Short, therefore, is man's life, and narrow is the corner of the earth wherein he dwells."—*Marcus Aurelius.*

"There is no man so good who, were he to submit all his thoughts and actions to the laws, would not deserve hanging ten times in his life."—*Montaigne.*

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